1948

PRICE $1.00

WORLD OIL

Established 1916 as The Oil Weekly

Section 2 of July, 1948, Issue of WORLD OIL

Atlas

Forty years of vigilant research and unending scientific development of specialized oil-field tools has earned and maintained for Hughes the reputation of "WORLD STANDARD OF THE DRILLING INDUSTRY."

HUGHES TOOL COMPANY
HOUSTON, TEXAS

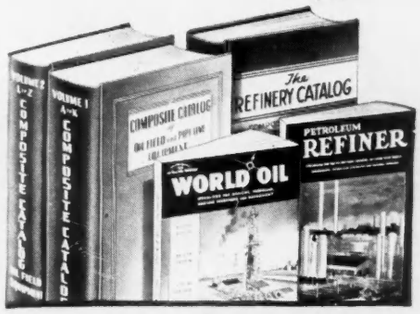
WORLD STANDARD OF THE INDUSTRY

Table of Contents, p. 7

IN EVERY FIELD all over the world Baker tools and equipment are providing successful results — ease and safety of operations — maximum economy — in drilling, cementing, completing and producing oil wells.

Worlds of Satisfaction

East Engin. Library
TN
860
.043



Specialized Oil Publications of
THE GULF PUBLISHING COMPANY
Box 2608, Houston (1), Texas

WORLD OIL and The COMPOSITE CATALOG
for the drilling-producing-pipe line industry

PETROLEUM REFINER and The REFINERY CATALOG
for the refining-natural gasoline industry

WORLD OIL ATLAS

Published by WORLD OIL, Houston, Texas

R. L. DUDLEY, *President, Publisher*

A. L. BURNS, *General Manager*

ADVERTISING STAFF
TOM W. NELSON, *Manager*
RANDALL BROOKS, *Assistant Manager*

NELSON BIGELOW
FRANK VICKREY
250 Park Ave.
New York 17, N. Y.

H. G. FITZPATRICK
332 S. Michigan Ave.
Chicago 4, Ill.

J. W. CURTS
W. W. Wilson Bldg.
Huntington Park, Calif.

ROGER MOTHERAL
1010 Euclid Ave.
Cleveland 15, Ohio

BILL ATCHESON
Hunt Bldg.
Tulsa 3, Okla.

CHARLES WYATT
3301 Buffalo Drive
Houston 6, Texas

CIRCULATION DEPARTMENT
CLINTON S. QUIN, JR., *Manager*

EDITORIAL STAFF
WARREN L. BAKER, *Editor*
AL REESE, *Managing Editor*
L. J. LOGAN, *Associate Editor*
ELTON STERRETT, *Engineering Editor*
GEORGE O. IVES, *International Editor*

J. E. KASTROP; CECIL SMITH; MARY E. POOLE;
KATHRYN CROUCH; ELSIE J. HIGGINS
3301 Buffalo Drive, Houston 6, Texas

HENRY OZANNE
250 Park Ave.
New York 17, N. Y.

GILBERT M. WILSON
W. W. Wilson Bldg.
Huntington Park, Calif.

ANTHONY GIBBON
Hunt Bldg.
Tulsa 3, Okla.

E. N. TIRATSOO
15 Redcliffe Gardens,
SW 10, London

Foreword . . .

THE 1948 WORLD OIL ATLAS, presented herewith, constitutes the third annual publication of a volume concentrating within its covers authoritative up-to-date maps and statistical data dealing with the oil industry's activities in every part of the world.

Although the two preceding ATLAS numbers received whole-hearted acceptance and superlative praise—breaking all petroleum trade magazine records for the quantities of extra copies ordered—readers will find the new ATLAS a decidedly more valuable reference source than its two predecessors. The maps are better and more detailed, and the statistical data are far broader and more complete.

As a result of being able to obtain improved or more authoritative base maps, 36 of the 63 map pages contained in this volume were completely redrawn. Most of these pages show several oil-active regions, or a total of 110 maps. In the case of many regions, detailed larger-scale maps outlining the size and shapes of fields are published for the first time, replacing old maps which showed only symbols for fields. In other instances, the new maps represent changes of such magnitude that it was expedient to redraft them from start to finish. In addition to the 36 maps completely redrawn, the majority of the other 31 map pages necessarily were revised to incorporate new or additional information.

The greatest improvement in the 1948 ATLAS, however, lies in the statistical information, which is much more complete than ever before. With the exception of the U. S. S. R. and some of its satellite countries, the new ATLAS contains current information on drilling and production activities by individual fields in every country which is experiencing any petroleum development. This is in contrast with previous ATLAS issues, in which vital basic data were not available from some countries. As a result, the new ATLAS presents the most complete assemblage of world-wide statistics on drilling, production, refining plants, and pipe line systems ever published anywhere at anytime.

This expanded coverage in the 1948 ATLAS is particularly valuable in view of the greatly enlarged scale upon which world-wide activities now are being conducted, a development which has increased substantially the interest—and need—of the industry for such information on these operations.

All this improvement—both in the maps and information—is due to greater cooperation on the part of oil companies and government petroleum bureaus. Those who helped in previous years continued to do so, and many others, seeing the work accomplished in preceding volumes of the ATLAS, furnished data for the first time.

We wish to extend our sincere thanks to all who helped furnish data for this year's ATLAS. Without their cooperation, we could not feel half so certain that the oil industry will find the 1948 WORLD OIL ATLAS the finest ever published.

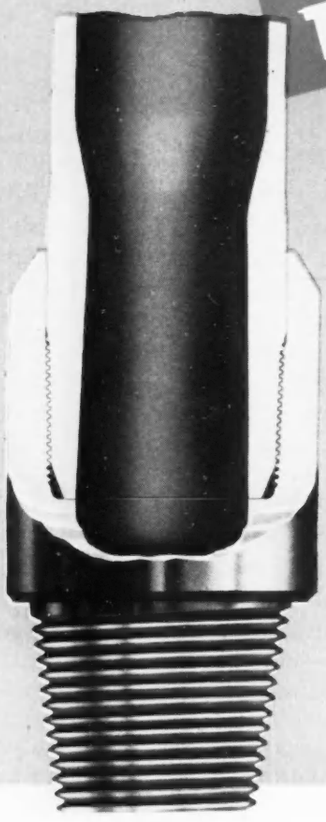
—The Editors.

WORLD OIL ATLAS published as Section 2 of WORLD OIL'S July, 1948 issue. WORLD OIL published every month except semi-monthly in February. Entered as *The Oil Weekly* as second class mail matter December 23, 1916, at the post office at Houston, Texas, under act of March 3, 1879.

For the finest in

TOOL JOINTS

REED
Super Shrink-Grip
TOOL JOINTS



for easy
replacement in the field

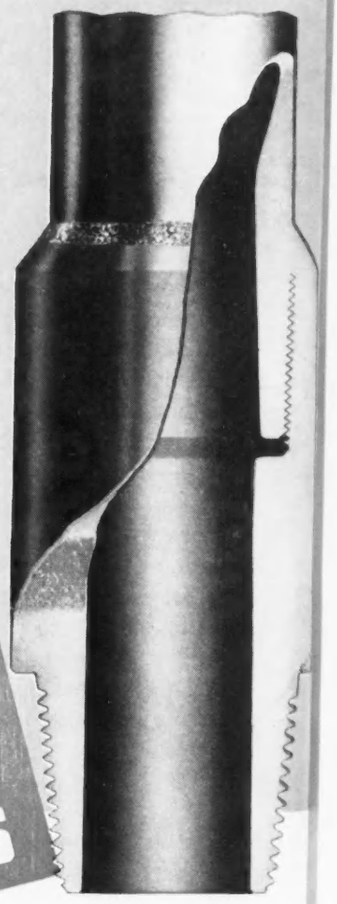
1. The "Shrink-Grip Safety Area" supports the drill pipe against bending and failure at last engaged thread. Seals against leakage.

2. The gauging shoulder assures proper make-up and seals against leakage.

3. Threads with a wide crest and root assure a dependable connection.

4. Accurate alignment between all tool joint and pipe threads reduces torsional stresses and the hazards of costly failures.

● Hand application at the rig reduces application and replacement cost.



REED
Counterbore Weld
(PATENTED)
TOOL JOINTS

If you prefer your tool joints welded onto your drill pipe, the Reed Counterbore Weld Tool Joint is your answer.

The Reed three-bead process of welding produces a strong, sturdy weld, as each bead is normalized when the next bead is applied. Deep penetration provides maximum holding capacity, and effective distribution of stresses is assured.

Reed's shop practice of welding with the drill pipe and tool joint held at a 45 degree angle, assures a better welding job than that usually obtained with the pipe held on a horizontal plane.

Editorial Index

1948 WORLD OIL ATLAS
Maps and Data

Data: Page

World

Demand and Supply....11, 13
Crude Oil Production....15, 19, 21
Crude Oil Production by Countries for All Years....25, 27, 29
Crude Oil Reserves....31
Refining Capacity....33
Completions....37, 39
Footage Drilled....37, 39
Producing Oil Wells....43, 45
Principal Operating Companies Outside of United States....49, 51
Measurement Conversion Factors....55

Charts:
Demand and Supply by Areas, 1946-47....11
Crude Oil Production Trend....15
Principal Producing Areas Outside of U. S....19
Refining Capacity and Crude Oil Production by Areas, 1947....33
Completions 1946-1947 by Areas....37
Footage Drilled 1946-1947 by Areas....37
Producing Oil Wells by Major Countries 43
Average Yield Per Well of Major Countries....43

North America

ALASKA
Data....57
Maps:
Alaska....57
Naval Petroleum Reserve....57

CANADA
Data:
Completions....63
Footage Drilled....63
Pipe Lines....75, 79
Production by Fields....59
Producing Formations and Depths....67
Producing Wells....59
Refineries....79
Wildcat Wells Drilled....75
Maps:
Canada....61
Alberta, Southern Area....65
Alberta, Central Area....69
Maritime Provinces....77
Norman Wells Area....61
Ontario Area....73

MEXICO
Data:
Completions....83
Footage Drilled....83
Pipe Lines....91
Production By Fields....81
Producing Formations and Depths....81
Producing Wells....81
Refineries....91
Wildcat Wells Drilled....83
Maps:
Pánuco Area....85
Golden Lane Area....89
Isthmus Area....93

UNITED STATES
Data:
Completions....107
Drilling Depth Records....105
Footage Drilled....107
Production, Crude Oil....99-101
Production, Natural Gas....103
Producing Wells....95
Refineries....105
Wildcat Wells Drilled....109-111

Central America

Data....115
Map....113

Page

West Indies

BAHAMA ISLANDS
Data....115
Map....117

CUBA
Data....121
Map....123

DOMINICAN REPUBLIC—HAITI
Data....121
Map....123

TRINIDAD
Data:
Pipe Lines....125
Production By Fields....125
Producing Formations and Depths....125
Producing Wells....125
Refineries....125
Map:
Southern Oil Area....127

South America

ARGENTINA
Data:
Companies....129
Completions....133
Concessions....See Maps
Footage Drilled....133
Pipe Lines....137
Production By Fields....129
Producing Formations and Depths....137
Producing Wells....129
Refineries....133
Wildcat Wells Drilled....137
Maps:
Argentina....131
Comodoro Rividavia Area....135
Mendoza Area....131
Neuquén (Plaza Huincul) Area....131
Salta Area....139

BOLIVIA
Data:
Completions....145
Footage Drilled....145
Production By Fields....145
Producing Formations and Depths....145
Producing Wells....145
Map....143

BRAZIL
Data:
Completions....149
Footage Drilled....149
Production By Fields....149
Producing Formations and Depths....149
Producing Wells....149
Refineries....149
Maps:
Reconcavo Area....147

CHILE
Data:
Completions....149
Footage Drilled....149
Producing Field....149
Producing Formation and Depth....149
Producing Wells....149
Wildcat Wells Drilled....149
Maps:
Southern Area....151
Cerro Manantiales (Springhill) Area....151

COLOMBIA
Data:
Companies....155, 159
Completions....155
Concessions....163
Footage Drilled....155
Pipe Lines....159

Page

COLOMBIA—Continued
Production By Fields....155
Producing Formations and Depths....159
Producing Wells....155
Wildcat Wells Drilled....159
Maps:
Colombia....153
Northern Area....157
Southern Area....161

ECUADOR
Data:
Companies....167
Concessions....See Map
Production By Fields....167
Producing Formations and Depths....171
Producing Wells....167
Refineries....167
Map:
Santa Elena Area....167

PARAGUAY
Data....171
Map....173

PERU
Data:
Companies....175
Completions....175
Concessions....See Maps
Footage Drilled....175
Production By Fields....175
Producing Formations and Depths....179
Producing Wells....175
Refineries....179
Maps:
Peru Concessions....177
Coastal Area....181

URUGUAY
Data....179

VENEZUELA
Data:
Companies....187
Completions....191
Footage Drilled....191
Pipelines....199
Production By Fields....187
Producing Formations and Depths....195
Producing Wells....187
Refineries....199
Wildcat Wells Drilled....199
Maps:
Venezuela....185
Central Area....193
Eastern Area....197
Western Area....189

Europe

ALBANIA
Data....203

AUSTRIA
Data:
Production By Fields....203
Producing Formations and Depths....203
Producing Wells....203
Refineries....203
Maps:
Vienna Basin Area....205

BELGIUM—BULGARIA
Data....207

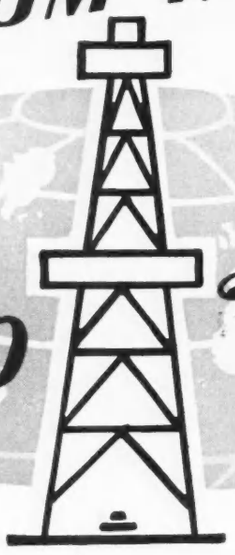
CZECHOSLOVAKIA
Data....207
Map:
Moravia Area....207

DENMARK
Data....211

FRANCE
Data:
Companies....211
Completions....215

Continued on Page 9

SUPPLYING THE PETROLEUM INDUSTRY-



WORLD WIDE

We have exceptional and complete facilities for supplying export requirements with proven equipment recognized as outstanding in both domestic and foreign fields. Our Export Division is staffed with seasoned personnel thoroughly familiar with all material needs in the Petroleum Industry and are ready to help you with your foreign equipment problems. Our service engineers are available in foreign fields to assist you.

Export Division

MID-CONTINENT Supply Company

42 BROADWAY, NEW YORK, N.Y.-U.S.A.

LOS ANGELES HOUSTON NEW ORLEANS SAN ANTONIO FORT WORTH

CARACAS, VENEZUELA BOGOTA, COLOMBIA

CONTENTS—Continued from Page 7

Page

FRANCE—Continued

Concessions ..... See Maps
Footage Drilled 215
Pipe Lines 215
Production By Fields 211
Producing Formations and Depths 211
Producing Wells 211
Refineries 215
Wildcat Wells Drilled 215
Maps:
Pechelbronn Area 209
Southern Area 213
St. Marcet Area 213

GERMANY

Data:
Companies 219
Completions 219
Footage Drilled 219
Pipe Lines 225
Production By Fields 219
Producing Formations and Depths 223
Producing Wells 219
Refineries 225
Wildcat Wells Drilled 223
Maps:
Border Area 217
Hamburg Area 217
Hannover Area 221
Heide Area 217

GREAT BRITAIN

Data:
Completions 227
Footage Drilled 227
Production by Fields 227
Producing Formations and Depths 225
Producing Wells 227
Refineries 227
Wildcat Wells Drilled 227
Maps:
Great Britain 229
Central Area 229

HUNGARY

Data:
Completions 231
Drilling Footage 231
Production by Fields 231
Producing Formations and Depths 231
Producing Wells 231
Refineries 231
Maps:
Lispe Area 233

ITALY

Data:
Production by Fields 235
Producing Formations and Depths 235
Refineries 235
Maps:
Po Valley Area 237

NETHERLANDS

Data:
Completions 235
Footage Drilled 235
Production by Fields 235
Producing Formations and Depths 235
Producing Wells 235
Maps:
Schoonebeek Area 217

NORWAY

Data 239

POLAND

Data:
Completions 239
Footage Drilled 239
Production by Fields 239
Producing Wells 239
Refineries 243
Maps:
Debowiec Area 241
Southern Area 241

PORTUGAL

Data 243

ROUMANIA

Data:
Completions 243
Footage Drilled 243
Production by Fields 243
Producing Formations 247
Producing Wells 243
Refineries 247
Maps:
Ploesti Area 245
Targul Mures Area 245

SPAIN

Data 247

SWEDEN

Data 247

TRIESTE

Data 247

YUGOSLAVIA

Data 247

U. S. S. R.

Data:
Pipe Lines 263
Production by Fields, European 251
Production by Fields, Asiatic 255

Page

U. S. S. R.—Continued

Producing Formations and Depths, European 267
Producing Formations and Depths, Asiatic 271
Maps:
European Area 249
Baku (Azerbaijan) Area 253
Carpathian (Former Polish) Area 269
Crimea Area 273
Daghestan Area 255
Emba Basin Area 261
Grozny Area 257
Kama River Area 265
Kuban-Maikop Area 273
Sakhalin Area 275
South Georgian Area 257
Turkmen 277
Ural-Volga Area 265
Uzbek-Tadzik-Kirgiz (Fergana) Area 277

Africa

ALGERIA

Data 279
Map 285

EGYPT

Data:
Companies 279
Completions 283
Concessions ..... See Map
Footage Drilled 283
Production by Fields 279
Producing Formations and Depts 279
Producing Wells 279
Wildcat Wells Drilled 283
Maps:
Northern Area 281

ETHIOPIA

Data 283

MOROCCO

Data:
Footage Drilled 287
Pipe Lines 287
Production by Field 287
Producing Formations and Depths 283
Producing Wells 287
Wildcat Wells Drilled 287
Maps:
Oil Area 285

TUNESIA

Data 287
Map 285

OTHER AFRICA

Data 287

Middle East

Data:
Production 291
Map:
Middle East Concessions 289

BAHREIN ISLAND

Data:
Completions 307
Concessions ..... See Maps
Footage Drilled 307
Production 303
Producing Formations and Depths 303
Producing Wells 303
Refineries 307
Maps 289, 305

CYPRUS

Data 303

IRAN

Data:
Completions 291
Concessions ..... See Map
Footage Drilled 291
Pipe Lines 295
Production by Fields 291
Producing Formations and Depths 295
Producing Wells 291
Refineries 291
Maps:
Iran 289
Southwestern Area 293

IRAQ

Data:
Companies 295
Completions 295
Concessions ..... See Maps
Footage Drilled 295
Pipe Lines 299
Production by Fields 295
Producing Formations and Depths 299
Producing Wells 295
Refineries 299

Page

IRAQ—Continued

Maps:
Iraq 289
Eastern Area 297

KUWAIT

Data:
Companies 299
Completions 299
Concessions ..... See Maps
Footage Drilled 299
Production 299
Producing Formations and Depths 299
Producing Wells 299
Maps 289, 301

LEBANON—PALESTINE

Data 303
Map 289

QATAR

Data 303
Maps 289, 305

SAUDI ARABIA

Data:
Companies 303
Completions 307
Concessions ..... See Maps
Footage Drilled 307
Pipe Lines 307
Production by Fields 303
Producing Formations and Depths 303
Producing Wells 303
Refineries 307
Maps:
Saudi Arabia 289
Persian Gulf Area 305

SYRIA—TRANSJORDAN

Data 307
Map 289

TURKEY

Data 307
Map 289

Far East—Oceania

AUSTRALIA

Data 339
Maps:
Roma Area 341
Northwestern Area 341

BURMA

Data:
Producing Fields 311
Producing Formations and Depths 311
Refineries 311
Maps:
Irrawaddy River Area 309

CHINA

Data 311
Maps:
China 313
Formosa Area 313

INDIA-PAKISTAN

Data 315
Maps:
Assam Fields 317
Punjab Fields 317

JAPAN

Data:
Companies 319
Completions 323
Footage Drilled 323
Production by Fields 319
Producing Wells 319
Refineries 323
Wildcat Wells Drilled 323
Maps:
Akita Fields 321
Hokkaido Fields 321
Niigata Fields 321
Yamagata Fields 321

PHILIPPINE ISLANDS

Data 323

EAST INDIES
(Borneo, Brunei, Ceran, Java, Netherlands New Guinea, Papua, Sarawak and Sumatra)

Data:
Completions 327
Footage Drilled 327
Production by Fields 327
Producing Formations 335
Producing Wells 327
Refineries 335
Maps:
Borneo, Balikpapan Fields 325
Borneo, Tarakan Fields 325
Brunei 325
Ceram Fields 329
Java Fields 329
New Guinea, Vogelkop Fields 329
Sarawak Fields 325
Sumatra, Northern Fields 333
Sumatra, Central Fields 333
Sumatra, Southern Fields 337

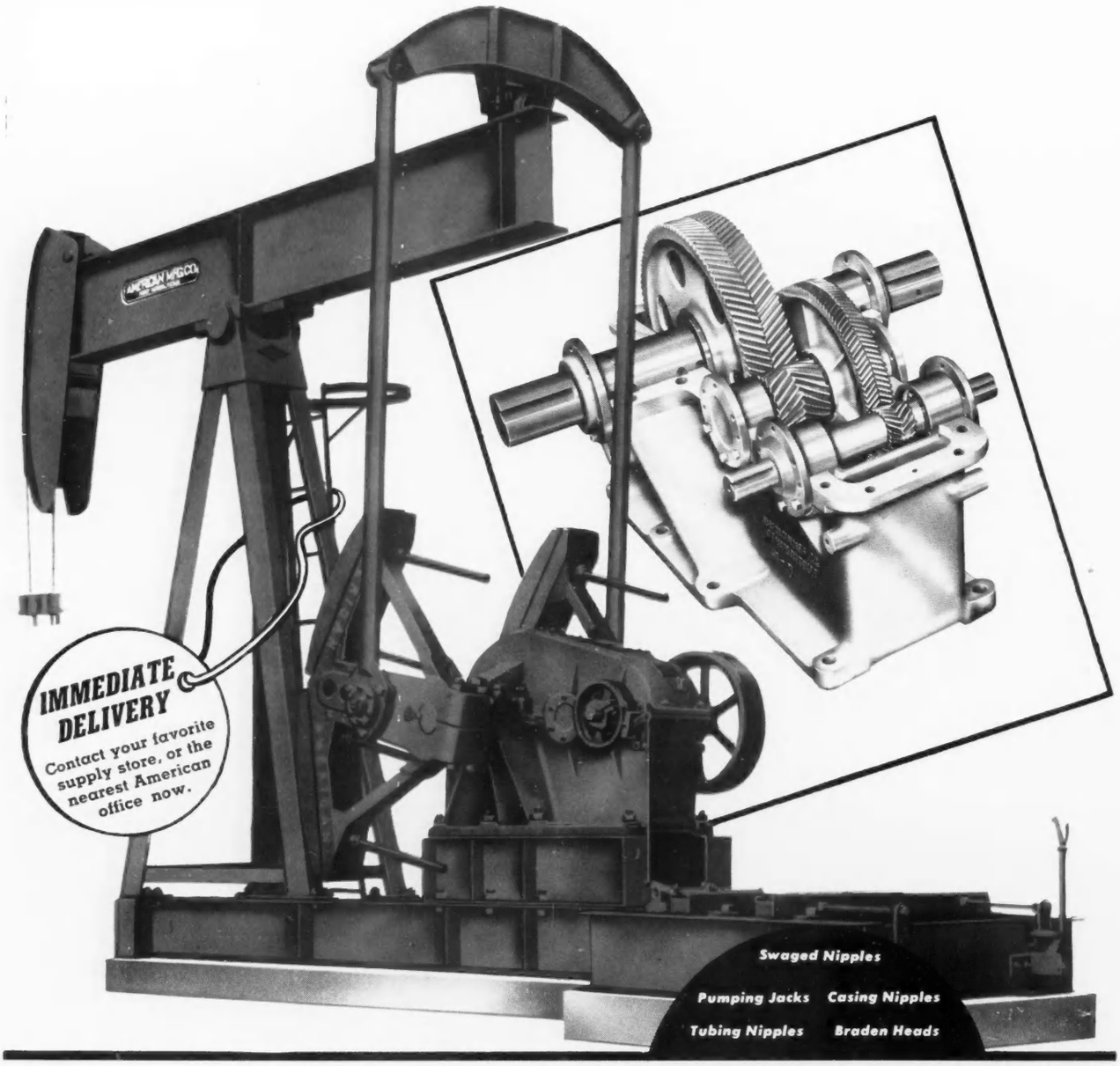
NEW ZEALAND

Data 339

American Units pump LONGER

THE NEW AMERICAN UNITS are built to give longer service, with less servicing, than ever before. And that's a lot of service, because there are plenty of American Units in the field today still pumping efficiently after twelve and fifteen years of continuous service.

The new American Units are designed and built to A.P.I. specifications, with fifteen specific improvements including improved A.P.I. Speed Reducer. Both SINGLE reduction and DOUBLE reduction Reducers are available, containing nine field-proven features that have made American Reducers famous for trouble-free service. Write for descriptive folder.



American Manufacturing Co. of Texas

FORT WORTH, TEXAS
Phone 8-2301
KILGORE, TEX., Phone 138 • ODESSA, TEX., Phone 3472
EXPORT OFFICE: Room 509, 475 Fifth Avenue, New York, New York

Unit Pumpers
Crown Blocks
Turnbuckles
Bull Plugs
Swings

SINCE 1924

WORLD PETROLEUM DEMAND AND SUPPLY

IN CONTRAST with preceding years, world demand for petroleum during 1947 exceeded the available supply.

Rising sharply to a new all-time peak, world demand for petroleum averaged 8,737,600 barrels daily during 1947, an increase of 12.4 percent or almost 1 million barrels above the 1946 average of 7,771,600 barrels per day. So much greater was the volume consumed than ever before that despite an unusually big gain available supply still lacked 35,000 barrels per day of fulfilling needs, contrasting with 1946 when the world was supplied with 156,900 barrels more per day than it used.

World supply of petroleum (crude oil, natural gasoline and synthetic products) totaled 8,702,600 barrels per day during the past year as compared with 7,929,500 barrels during 1946. Nevertheless, supply did not increase as rapidly as did demand, the volume produced rising 594,450 barrels per day, or 9.7 percent, while demand was increasing of 966,000 barrels, or 12.4 percent.

The 1947 supply was made up of 8,281,500 barrels of crude oil and 421,100 barrels per day of natural gasoline and synthetic products. Both crude oil and natural gasoline, etc., were produced in bigger quantities than at any previous time. Daily crude oil output was up 743,400 barrels, or 10 percent, over the peak attained in 1946, while production of natural gasoline and synthetic products rose 29,700 barrels or 7.6 percent.

Figures on world supply and demand used herewith were compiled by C. J. Bauer, petroleum economist with Standard Oil Company (New Jersey). Due primarily to crediting Russia with producing a bigger yield, figures given by Mr. Bauer for world crude oil production in 1947 are somewhat larger than those compiled by WORLD OIL ATLAS and presented in the story and tables beginning on page 15 of this issue.

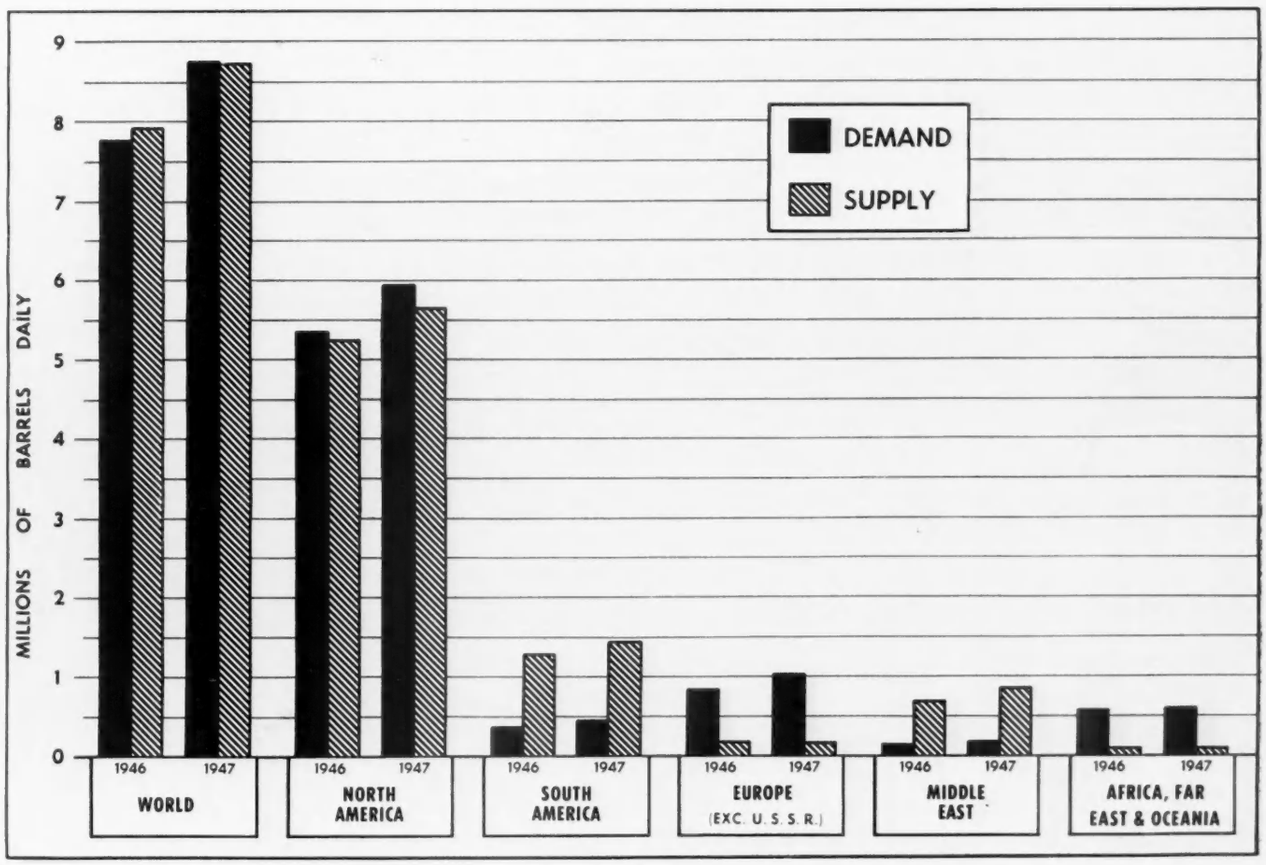
The United States accounted for more than half of the increase that occurred in world demand, as its consumption of 5,449,200 barrels daily during 1947 constituted a gain of 542,500 barrels over 1946 rates. Demand for petroleum in the rest of the world amounted to 3,288,400 barrels per day, which represented a growth of 422,500 barrels over 1946. Percentagewise, however, the 11 percent gain in United States demand was less than the 14 percent growth registered by other countries.

During 1947 only two large geographical regions of the world produced more petroleum than they consumed, hence the numerous shortage areas of the world were necessarily dependent upon these two areas for enough oil to make up the difference between their domestic supply and needs.

The two surplus producing regions were the Caribbean area of northern South America and the Middle East group of countries in Asia. Since these two regions produced almost one-fourth of the world's supply and consumed but 4 percent of the oil, together they were able to ship 1,808,300 barrels per day to satisfy the needs of other countries.

The Caribbean region, comprising the fields of Venezuela, Colombia and Trinidad, continued to be the world's largest surplus petroleum area. Production in this region, due primarily to Venezuela, has risen sharply in recent years, enabling the territory to steadily enlarge its export shipments. Production from this area amounted to 1,318,400 barrels per day during 1947, a substantial increase from the 1,181,800 barrels produced daily in 1946 and with 623,268 barrels in

Petroleum Demand and Supply, 1946-1947



United's supervisory staff travels regularly to each crew to insure SUCCESSFUL GEOPHYSICAL SERVICE

UNITED GEOPHYSICAL COMPANY

SEISMOGRAPH • GRAVIMETER • MAGNETOMETER

Herbert Hoover, Jr. President

595 EAST COLORADO ST., PASADENA, CALIFORNIA, U. S. A.

TULSA, HOUSTON, NEW YORK, FAIRBANKS

APARTADO 1085, CARACAS, VENEZUELA

RIO DE JANEIRO, BRASIL SANTIAGO, CHILE BOGOTA, COLOMBIA BEIRUT, LEBANON

WORLD PETROLEUM DEMAND AND SUPPLY—Continued

1938. These producing rates allowed the Caribbean countries to export 1,136,800 barrels per day in 1947, compared with 1,028,800 barrels in 1946 and 568,800 barrels during 1938.

The Middle East area has shown the largest rate of growth as a surplus producing area. This region, embracing Iran, Iraq, Bahrein, Saudi Arabia and Kuwait, has increased its daily production from 328,241 barrels per day in 1948 to 690,400 barrels daily in 1947 and to 840,300 barrels per day in 1947. Consequently, quantities available for export shipments from the Middle East, after satisfying domestic requirements, have jumped from 254,700 barrels daily in 1938 to 545,000 barrels in 1946, and to 671,500 barrels during 1947. Further sharp gains in production, and therefore in export shipments, are to occur in the Middle East. Within a few years, if conditions permit the completion of pipe lines now either under construction or proposed, the Middle East undoubtedly will supplant the Caribbean area as the world's largest surplus producing area.

The dependence of the world's various shortage areas during 1947 upon only two regions for balancing supply with their wants was in contrast with preceding years, when a third important source, the United States, also exported large quantities. Last year, however, domestic demand in the United States equalled its domestic supply, and record level imports of 450,000 barrels daily were on a level with the nation's export shipments. This was directly contrary to the country's position in preceding years, when it exported considerably greater quantities than it imported. As recently as 1938, United States exports of petroleum exceeded its imports by 382,000 barrels per day. Even in 1946, this country exported 163,600 barrels more per day than it imported. The unusually sharp growth of domestic consumption, however, has absorbed all surplus producing capacity and henceforth the United States is expected to require steadily enlarged imports while exporting decreasing quantities, mostly in the form of special products.

This means that hereafter all countries with inadequate petroleum supplies must look more and more to either the Caribbean or the Middle East region as their supply source. Other countries, of course, will participate in the international movement of petroleum products, but only to a small degree, and usually they will import more than they export.

Europe, excluding Russia, continued to be the major shortage area of the world. Declining production and rising demand, increased the amount of imports required to balance supply with consumption. Domestic production dropped from 182,600 barrels daily in 1946 to 161,900 barrels per day in 1947. Meanwhile, domestic demand in Europe rose from 808,300 barrels per day in 1946 to 1,010,600 barrels in 1947. Consequently, Europe's demand in 1947 exceeded its local supply by 848,700 barrels daily during 1947, in contrast with a supply shortage of 625,700 barrels daily in 1946.

The combined Far East and Oceania region also was dependent to a very large extent on other areas for enough petroleum to satisfy its requirements, producing less than 1 percent of the world's supply while using nearly 5 percent of the world's requirements. Consequently, this region's demand exceeded its supply by 349,000 barrels per day.

North America, outside of the United States, was another region depending heavily upon oil imports, its domestic supply lacking 310,500 barrels daily of fulfilling needs.

Although Africa consumes relatively small quantities of petroleum, it failed by 153,800 barrels daily to produce enough in 1947 to satisfy demand.

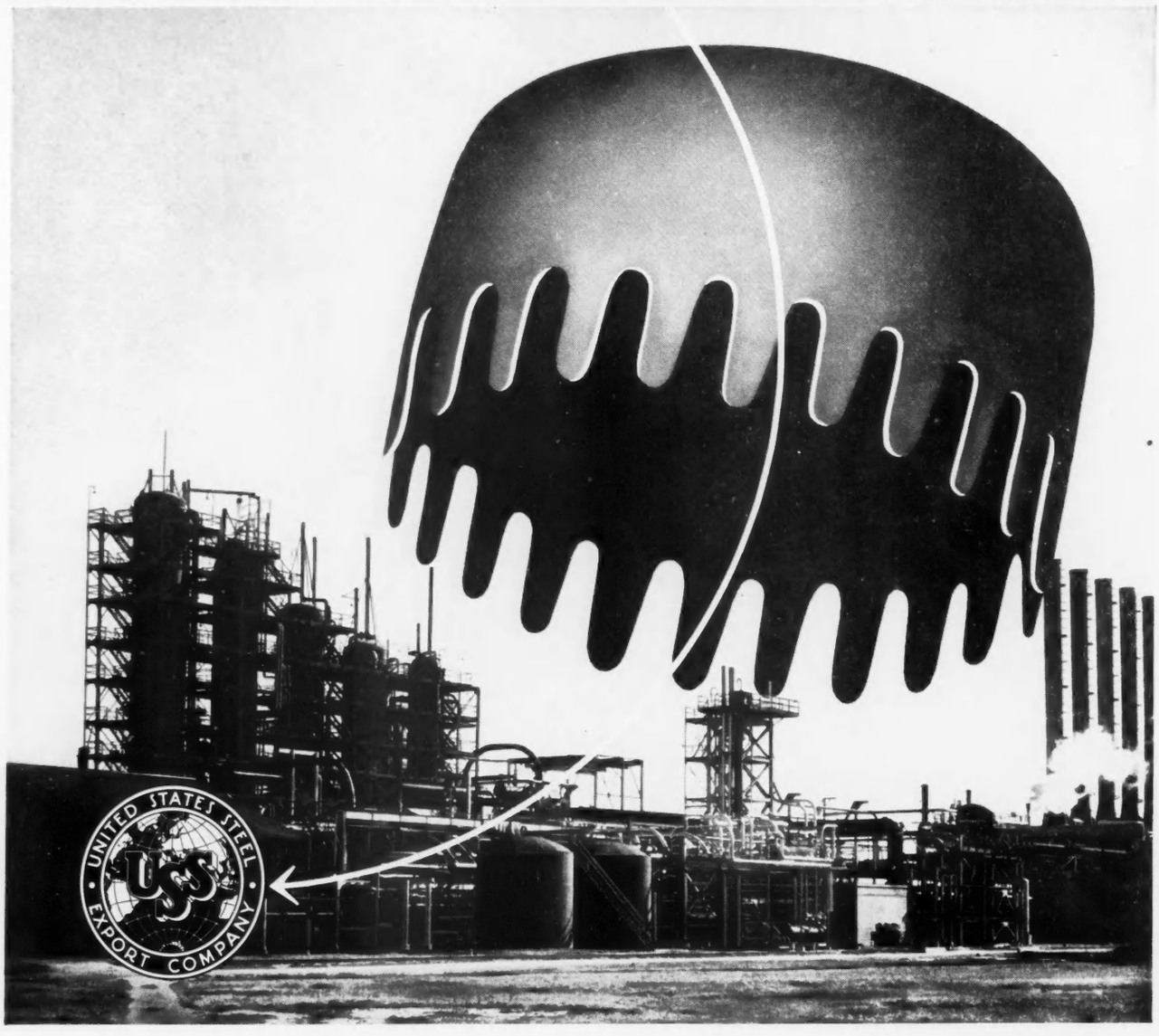
Petroleum Demand and Supply by Areas

Barrels Per Day

	Domestic Demand	DOMESTIC SUPPLY			Excess Supply Over Demand	Excess Demand Over Supply	PERCENT OF WORLD TOTAL	
		Crude Oil	Natural Gasoline, Etc.	Total			Domestic Demand	Domestic Supply
1947								
United States	5,449,200	5,085,200	364,000	5,449,200	.....	.....	62.36	62.62
Other North America	487,300	174,500	2,300	176,800	.....	310,500	5.58	2.03
Total North America	5,936,500	5,259,700	366,300	5,626,000	.....	310,500	67.94	64.65
Caribbean Area	181,600	1,314,600	3,800	1,318,400	1,136,800	.....	2.08	15.15
Other South America	262,300	102,700	3,300	106,000	.....	156,300	3.00	1.22
Total South America	443,900	1,417,300	7,100	1,424,400	980,500	.....	5.08	16.37
Europe (Excluding Russia)	1,010,600	128,300	33,600	161,900	.....	848,700	11.57	1.86
Russia	578,000	543,000	10,000	553,000	.....	25,000	6.62	6.35
Africa	180,300	25,500	1,000	26,500	.....	153,800	2.06	0.30
Middle East	168,800	840,300	.....	840,300	671,500	.....	1.93	9.66
Far East and Oceania	419,500	67,400	3,100	70,500	.....	349,000	4.80	0.81
TOTAL WORLD	8,737,600	8,281,500	421,100	8,702,600	.....	35,000	100.00	100.00
1946								
United States	4,906,700	4,749,100	321,200	5,070,300	163,600	.....	63.13	63.94
Other North America	440,000	156,400	3,200	159,600	.....	280,400	5.66	2.02
Total North America	5,346,700	4,905,500	324,400	5,229,900	.....	116,800	68.79	65.96
Caribbean Area	153,600	1,177,500	4,300	1,181,800	1,028,200	.....	1.97	14.90
Other South America	223,600	98,200	3,300	101,500	.....	122,100	2.88	1.28
Total South America	377,200	1,275,700	7,600	1,283,300	906,100	.....	4.85	16.18
Europe (Excluding Russia)	808,300	136,400	46,200	182,600	.....	625,700	10.40	2.30
Russia	514,700	438,200	9,000	447,200	.....	67,500	6.62	5.64
Africa	160,000	24,500	.....	24,500	.....	135,500	2.06	0.31
Middle East	145,000	690,400	.....	690,400	545,400	.....	1.87	8.71
Far East and Oceania	420,700	67,400	4,200	71,600	.....	349,100	5.41	0.90
TOTAL WORLD	7,772,600	7,538,100	391,400	7,929,500	156,900	.....	100.00	100.00

Source: C. J. Bauer, Petroleum Economist, Standard Oil Company (New Jersey).

STEEL FOR THE WORLD OF TOMORROW



Refineries Cut Cleaning Time up to 90%
. . . with U·S·S STAINLESS STEEL

Bubble caps and trays of U·S·S Stainless Steel keep coking and fouling trouble at a minimum—reduce cleaning to a mere hosing down. In addition, tough, ductile U·S·S Stainless Steel permits installation of more caps per tray — and more teeth or slots per cap — to insure sharper fractionation through better mixture of vapor and liquor.

In bubble tower linings, the high chromium content of U·S·S Stainless Steel gives maximum resistance to corrosion — even when processing sour crudes at 900°F. or higher. Towers lined in the field over ten years ago still give satisfactory service.

A product of the world's largest steelmaker, U·S·S Stainless Steel serves many refinery purposes—in each case to increase throughput, improve quality, and lower operating cost. Measure its performance against your needs.

U·S·S Steel Products for Oil Fields and Refineries

TIGER BRAND WIRE ROPE

★

DRILL PIPE

★

CASING

★

OIL WELL TUBING AND DRIVE PIPE

★

BOILER AND CRACKING STILL TUBES

★

UNAFLO OIL WELL CEMENT

UNITED STATES STEEL EXPORT COMPANY

★ ★ 30 CHURCH STREET, NEW YORK 8, U. S. A. ★ ★

WE SERVE THE WORLD with superior steels from the world's largest steelmake-

WORLD CRUDE PRODUCTION

CRUDE OIL production rose sharply during 1947 to another new all-time peak, world output being nearly 700,000 barrels per day greater than the record volume produced during 1946. A similar increase is in prospect for 1948 and years in the immediate future. With every effort being made to expand production rates sufficiently to meet rapidly growing consumption rates, the yield during the latter part of 1947 and the first quarter of 1948 was substantially above the 1947 level.

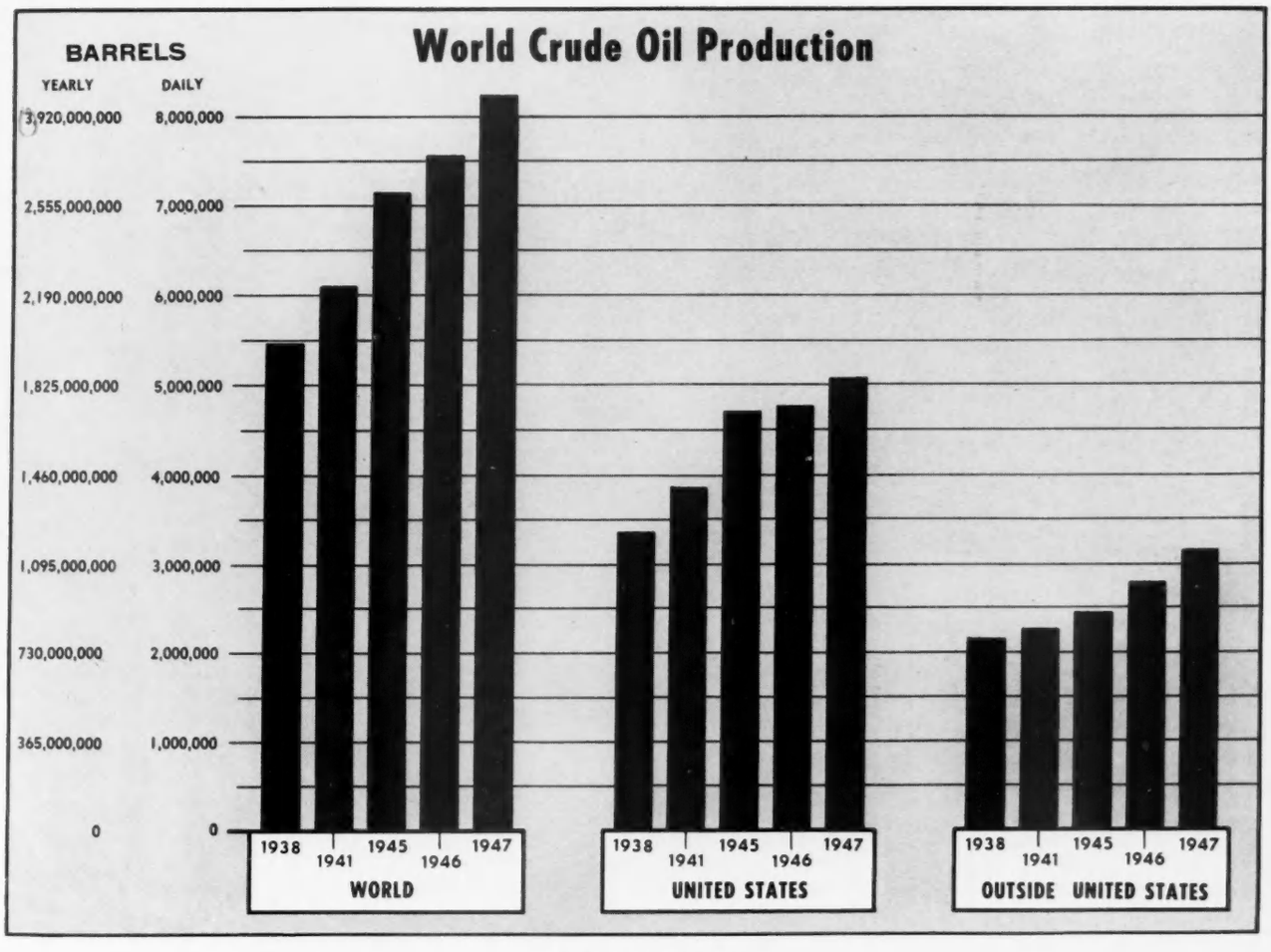
The world's annual production of crude oil exceeded 3 billion barrels for the first time in history last year. This volume constitutes a phenomenal increase during the past decade. A total of 3,004,424,000 barrels were produced during the year 1947. This represented a gain of 353,719,000 barrels over the amount produced in 1946, and was slightly in excess of 1 billion barrels more than 1938's yield. The increase was a 9.2 percent growth over 1946, and was 51 percent larger than in 1938.

In terms of daily average yields, 1947 output was 8,231,299 barrels, as compared with 7,536,178 barrels in 1946 and 5,446,688 barrels in 1938. Thus, the 1947 yield exceeded the 1946 rate by 695,121 barrels daily and was 2¾ million barrels per day larger than in 1938.

Production assuredly will be even greater in 1948 than the peak attained in 1947. World crude oil production by the end of 1947 already was considerably higher than the 1947 average, averaging 8,716,136 barrels daily or 483,837 barrels more than the daily average for the full year 1947. Output increased further during the first quarter of 1948, and additional gains during the remainder of 1948 are to be expected as new transportation systems go into operation.

The United States has been the largest contributor to world production growth since 1938, contributing 1¾ million barrels of the daily average growth while output for the rest of the world was growing by 1 million barrels per day. However, crude production of the United States did not increase quite as much during 1947 as did the combined output of other countries. United States' 1947 production was 334,700 barrels more per day than in 1946, but the rest of the world boosted its yield by 360,400 barrels daily.

United States production in 1947 averaged 5,085,225 barrels



(All Figures in Barrels)

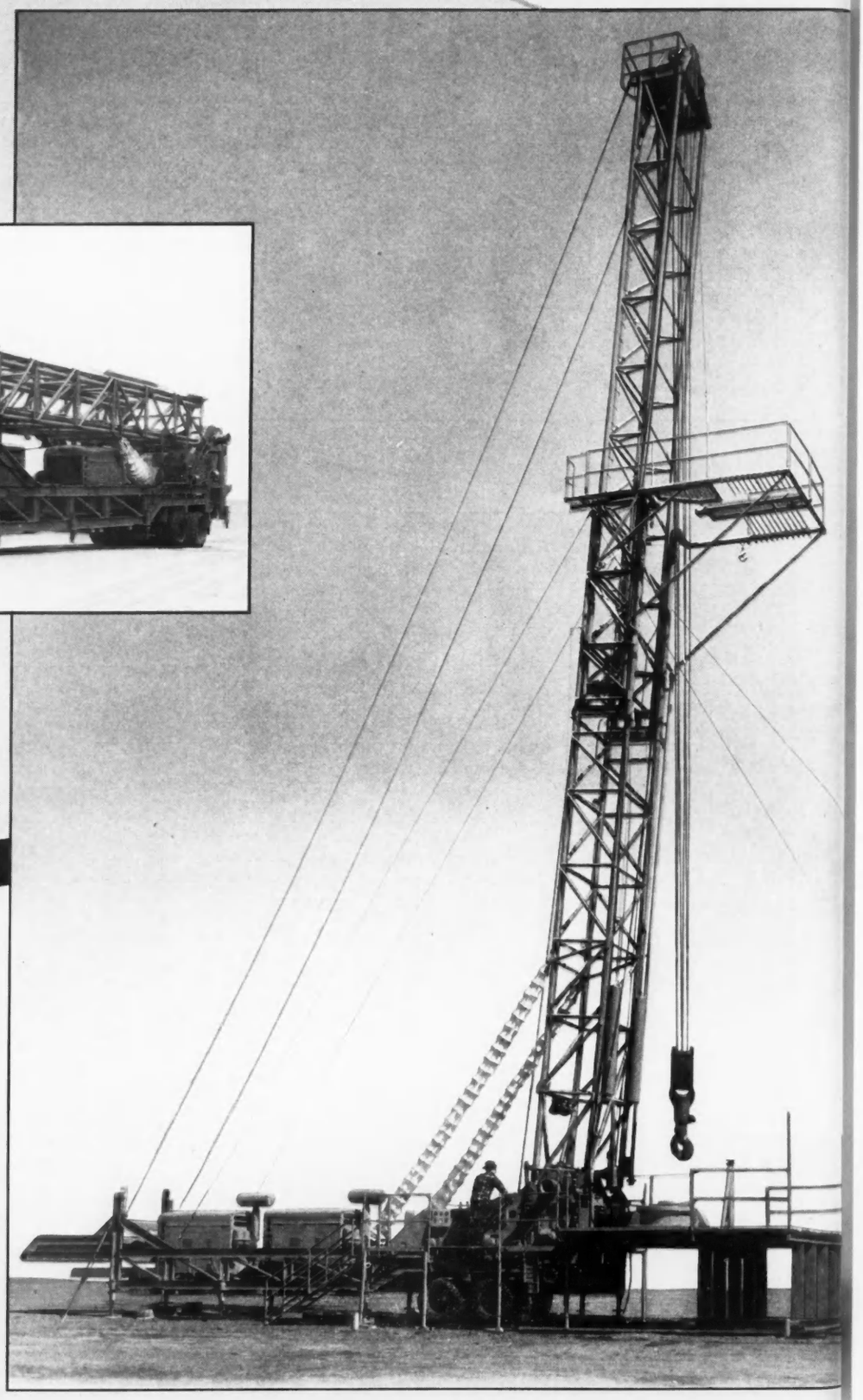
YEAR	WORLD		UNITED STATES		OUTSIDE U.S.A.		YEAR	WORLD		UNITED STATES		OUTSIDE U.S.A.	
	Annual Total	Daily Average	Annual Total	Daily Average	Annual Total	Daily Average		Annual Total	Daily Average	Annual Total	Daily Average	Annual Total	Daily Average
1938	1,988,041,000	5,446,000	1,214,355,000	3,327,000	773,686,000	2,119,000	1943	2,256,652,000	6,182,600	1,505,613,000	4,125,000	751,039,000	2,057,600
1939	2,086,160,000	5,715,500	1,264,962,000	3,465,600	821,198,000	2,249,900	1944	2,550,954,000	6,969,800	1,677,904,000	4,584,400	873,050,000	2,385,400
1940	2,149,821,000	5,873,800	1,353,214,000	3,697,300	796,607,000	2,176,500	1945	2,594,407,000	7,107,900	1,713,655,000	4,694,900	880,752,000	2,413,000
1941	2,220,657,000	6,084,000	1,402,228,000	3,841,700	818,429,000	2,242,300	1946	2,750,705,000	7,536,200	1,733,939,000	4,750,500	1,016,766,000	2,785,700
1942	2,093,083,000	5,734,500	1,386,645,000	3,799,100	706,438,000	1,935,400	1947	3,004,424,000	8,231,300	1,856,107,000	5,085,200	1,148,317,000	3,146,100

"CARDWELL" EQUIPMENT

COMPLETE, SELF-CONTAINED, TWIN-ENGINE DRILLING AND SERVICING RIG. FULLY PORTABLE WITHOUT DISMANTLING BLOCK, MAST OR ENGINES

"CARDWELL" TRAILERIG

Recommended for drilling to 5,000 feet with 4½-inch drill pipe and workover jobs to 10,000 feet.



FEATURES: Portability Plus. Rig is transported with lines reeved up and can be ready for operation in thirty minutes after reaching location. Two-way hydraulic system automatically controls mast when going over center without use of guy or snubbing line. Unobstructed floor space 15x16½ feet with plenty of space for blowout preventer equipment without use of ramps. Draw works has "Cardwell" Air-Disc clutches throughout. Air-Disc clutches in both ends of drum provide high and low drum speeds operated by single lever. All necessary hoisting, mud pump and table speeds available simultaneously. Optional sand line drum has "Cardwell" Air-Disc clutch.

Pneumatic-tired trailer model is 59′ 3″ long and 8′ wide. Athey tracks are available.

WORLD CRUDE PRODUCTION—Continued

daily, a 7 percent increase over the 4,750,518 barrels produced daily in 1946 and compared with 3,327,000 barrels in 1938. Crude production outside of the United States amounted to 3,146,100 barrels daily last year, a figure which compared with 2,785,700 barrels in 1946 and 2,119,000 barrels in 1938. At the end of 1947, the United States had increased its yield to 5,336,900 barrels daily, up 250,000 barrels from its 1947 daily average; while the rest of the world had raised its producing rate by 233,000 barrels daily to a level of 3,379,236 barrels per day.

The sharp advance in global crude output has been attained primarily through enlarged producing rates established in three areas—the United States, Venezuela and the Middle East group of countries. The collective yield of these countries constituted 86 percent of the world's production in 1947 and 1946, as compared with 76 percent in 1938. Their 1947 daily production accounted for 592,417 barrels of the 695,121-barrel growth registered throughout the world. Since 1938 the production of these countries has increased almost 3 million barrels daily although the world as a whole has shown a gain of only 2¾ million barrels per day. These are the countries which will contribute most of the growth in output anticipated during 1948.

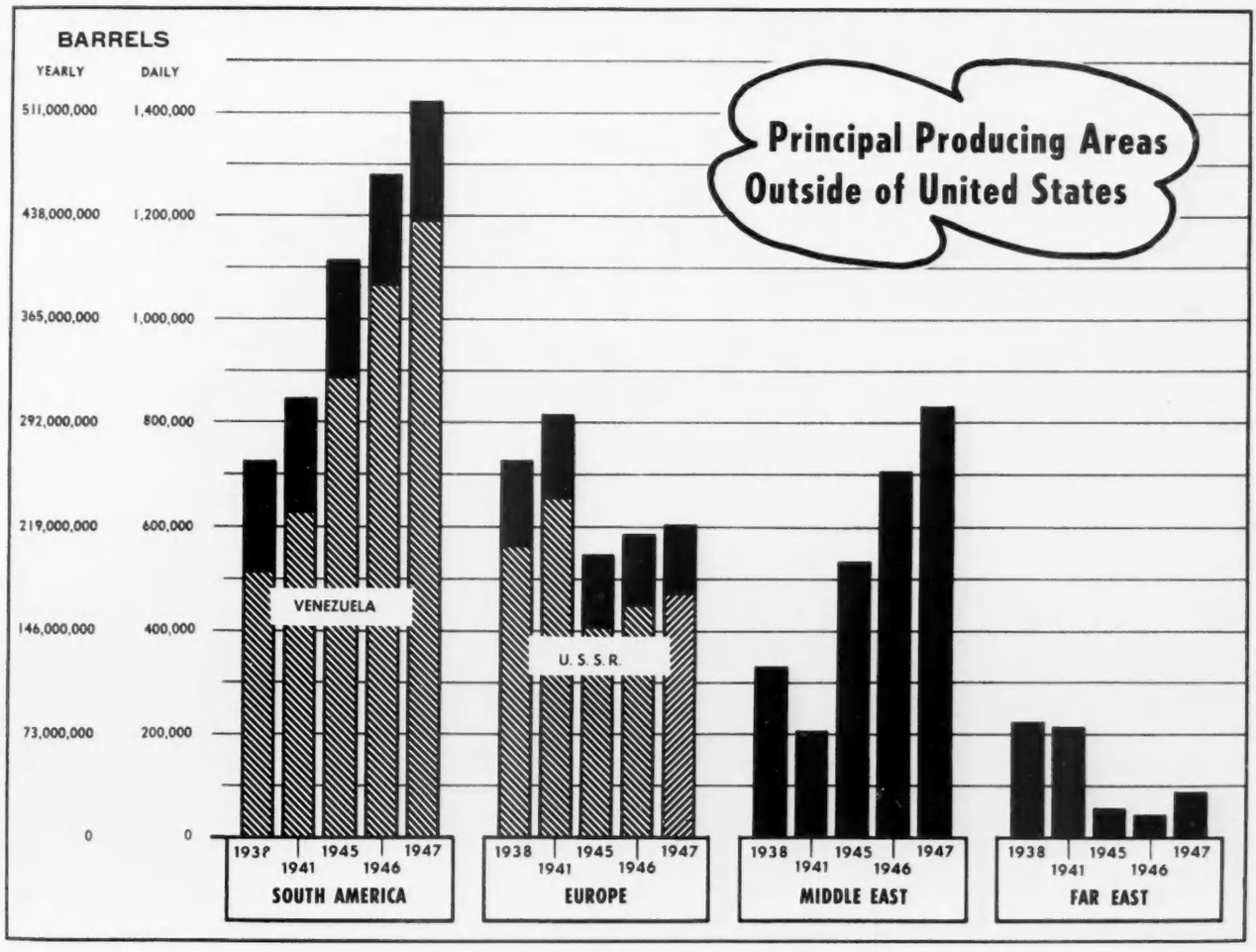
The Middle East countries (Iraq, Iran, Kuwait, Bahrein and Saudi Arabia) produced 832,409 barrels per day during 1947. This was 130,590 barrels, or 18 percent, more than in 1946, and was 504,168 barrels, or 153 percent, more than produced in 1938. Middle East production had been stepped up another 125,000 barrels daily by the end of 1947 to 958,402 barrels, and further increases are due during 1948.

Saudi Arabia, which succeeded in upping its production by slightly more than 80,000 barrels per day in producing an average of 246,170 barrels daily, contributed the greater share of the Middle East gain. It has accounted for almost half of the Middle East gain since 1938, when it was producing only 1356 barrels per day.

Kuwait, which produced for only half of 1946, was a major factor in the increase shown by the Middle East during the past year. Kuwait's daily average production in 1947 of 44,458 barrels was almost three times the 16,227 barrels produced daily in 1946.

Iran, Saudi Arabia and Kuwait are all scheduled to have additional transportation facilities in operation during 1948, and therefore will yield enlarged quantities of crude. In fact, all three of these countries were producing considerably more during the latter part of 1947 than they did during the earlier months of the year. At the end of the year, Iran was producing 472,000 barrels daily or 25,000 barrels more than its 1947 daily average. Saudi Arabia had stepped its production up 60,000 barrels per day to 305,000 barrels, and Kuwait was producing 62,000 barrels daily or 17,500 barrels more than it averaged throughout the year.

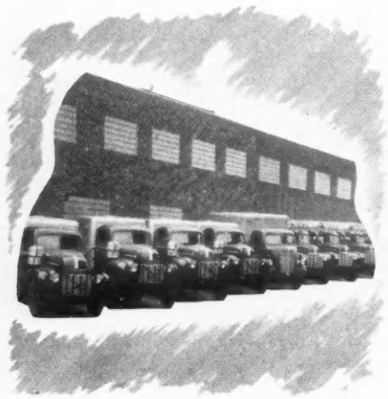
Iraq, where production is entirely from the Kirkuk field, supplied 91,720 barrels per day in 1947, slightly under the pace maintained during 1946. The production of Iraq was originally scheduled to be doubled by this time, but Palestine warfare has prevented the final completion of a new pipe line from the Kirkuk field, and may even result in curtailing of

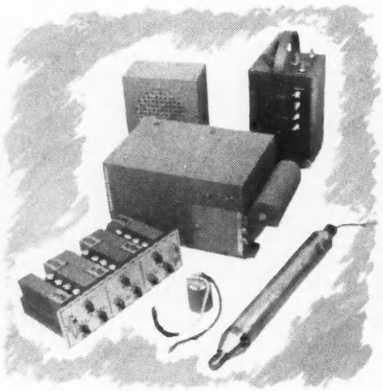


There's a Reason

Behind the Better Definition of Reflections by ELI Seismograph Equipment

Eli Has Built More Seismic Equipment Than Any Other Manufacturer





As a pioneer in the building of seismograph equipment, Engineering Laboratories, Inc. has had over 15 years, experience in its manufacture, and has manufactured more of this type equipment than any other manufacturer. This vast back-log of experience is your assurance of getting instruments of first quality. ELI equipment is in use all over the world, and has met and withstood everything geography and climate could offer in the way of rough usage and difficult operating conditions. Users report that their ELI equipment will stand rough treatment better, longer, with less maintenance, than the equipment of any other manufacturer.

The building of such a volume of seismograph equipment has afforded ELI the opportunity to use semi-mass production methods to keep unit costs lower. ELI has a large staff of research engineers who are continuing the study of problems of seismic exploration while production departments are manufacturing equipment which is the best possible to produce in the light of present knowledge.

Uniform Top Quality Maintained by Manufacturing All Major Component Parts

ELI cannot and does not rely on the uniformity of tolerances of components by outside manufacturers. ELI knows the quality of the components will not detract from the high quality of their equipment, because materials, designs, specifications, are all its own. Even tiny condensers are not taken for granted. One manufacturer of such parts supplies ELI with thousands, which are carefully tested in the laboratories for the close tolerances demanded. Condensers not passing rigid tests are returned to the supplier, for use in places where close tolerances are not demanded.

As a result of ELI's unceasing efforts for perfection, ultimate needed sensitivity, uniformity of operation of all traces, reliability of operation over long periods under the most severe conditions are accomplished.

Completeness and Order of Inspection Assures Uniform Accuracy of All ELI Component Parts

The thoroughness with which all ELI parts are inspected and tested assures the customer of uniform accuracy of all component parts. ELI's testing facilities are praised by the Bureau of Standards as being far superior to their needs. ELI is one of the few manufacturers, whose products the Army and Navy will accept without having those products undergo additional tests.

All parts of ELI's seismograph equipment are examined minutely, and are tested and re-tested for accuracy, strength and durability.

This is just another reason why ELI equipment stands up so well in the field . . . and another reason why ELI equipment is in world-wide use.

For Literature Write:

Dept. OA-48, 624 E. 4th, Tulsa 3, Oklahoma

Engineering Laboratories, Inc.

TULSA 3, OKLAHOMA GARLAND, TEXAS

EXPORT MANAGER

E. F. Gahan, Inc.
500 5th Ave.
New York, N. Y.

REPRESENTATIVES

in Argentina, Brazil, Chile,
Pargauay, Peru and Uruguay.
Geotecnica, S. A. Industrial and Commercial
Charcas 1775 Buenos Aires, Argentina

WORLD CRUDE PRODUCTION—Continued

the country's yield. Any increase from Iraq must await the completion of this pipe line or of a more northern one upon which work is being commenced due to the situation in Palestien. The latter necessarily is a year or more away.

Little reliable information again was available from the U. S. S. R. and its satellite countries, making it necessary to estimate their production. It is estimated that Russian production increased to 471,233 barrels per day as compared with 449,315 barrels daily in 1947.

Venezuela, the principal producing source of South America and second only to the United States, continued to increase its yield. The country produced 1,191,465 barrels per day in 1947, a gain of 127,120 barrels daily or 11.9 percent over its 1946 output. The 1947 production was slightly more than twice the 515,545 barrels this nation produced in 1938. There seems no reason to doubt Venezuela will record another increase in 1948, for it was producing 1¼ million barrels daily at the end of 1947.

Percentagewise, the East Indies area of the Far East recorded the largest growth of the past year. Daily average production of this region during 1947 was 58,162 barrels in contrast with only 11,506 barrels in 1946. However this was still far below its prewar yield of 175,000 barrels per day in 1938. The rehabilitation of war-destroyed fields progressed sufficiently to enable the East Indies to be producing 106,956 barrels per day by the end of 1947, and additional increases are probable during 1948.

Trends in World Crude Oil Production, By Countries, and Cumulative Production Through 1947

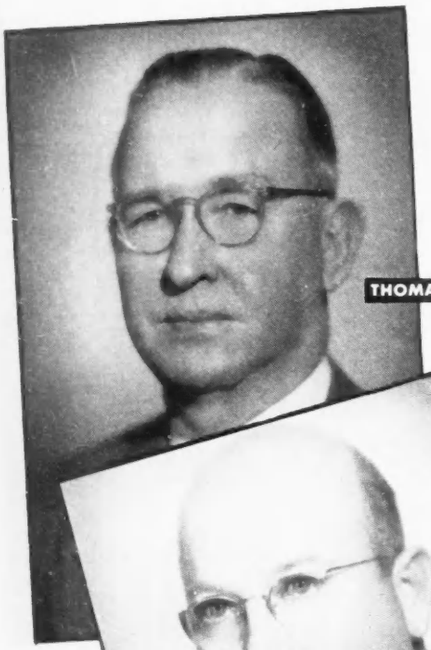
(Sources: U. S. Bureau of Mines except 1947 from private sources or estimated by WORLD OIL)

Continent and Country	ANNUAL PRODUCTION (Thousands of Barrels)			DAILY AVERAGE PRODUCTION (Actual Barrels)				YEAR'S PRODUCTION AS PERCENT OF WORLD			CUMULATIVE PRODUCTION TO JANUARY 1, 1948 (Thousands of Barrels)	
	1938	1946	1947	1938	1946	1947	% Diff. '46–'47	1938	1946	1947	Total	As % of World
NORTH AMERICA—												
Canada	6,966	7,668	7,722	19,085	21,008	21,156	+ 0.7	0.35	0.28	0.26	128,955	0.24
Cuba	78	150	280	214	411	767	+ 86.6	0.01	0.01	0.01	1,705	.....
Mexico	38,506	49,235	55,917	105,496	134,890	153,197	+ 13.6	1.94	1.79	1.86	2,290,126	4.17
United States	1,214,355	1,733,939	1,856,107	3,327,000	4,750,518	5,085,225	+ 7.0	61.08	63.03	61.78	35,082,509	63.94
Total North America	1,259,905	1,790,992	1,920,026	3,451,795	4,906,827	5,260,345	+ 7.2	63.38	65.11	63.91	37,503,295	68.35
SOUTH AMERICA—												
Argentina	17,076	20,604	21,846	46,784	56,449	59,852	+ 6.0	0.86	0.75	0.73	388,494	0.71
Bolivia	226	363	375	619	995	1,027	+ 3.2	0.01	0.01	0.01	3,827	0.01
Brazil	.....	67	97	.....	184	266	+ 44.6	.....	.....	.....	387	.....
Colombia	21,582	22,118	25,882	59,129	60,597	70,910	+ 17.0	1.09	0.80	0.86	418,529	0.76
Ecuador	2,246	2,323	2,282	6,153	6,364	6,252	— 1.8	0.11	0.09	0.08	41,218	0.07
Peru	15,839	12,456	12,764	43,395	34,126	34,970	+ 2.5	0.80	0.45	0.43	357,603	0.65
Trinidad	17,737	20,233	20,521	48,594	55,433	56,222	+ 1.4	0.89	0.74	0.68	351,737	0.64
Venezuela	188,174	388,486	434,885	515,545	1,064,345	1,191,465	+ 11.9	9.46	14.12	14.47	4,031,612	7.35
Total South America	262,880	466,650	518,652	720,219	1,278,493	1,420,964	+ 11.1	13.22	16.96	17.26	5,593,407	10.19
EUROPE—												
Albania	752	365	365	2,060	1,000	1,000	.....	0.04	0.01	0.01	9,404	0.02
Austria	383	5,734	6,684	1,049	15,710	18,313	+ 16.6	0.02	0.21	0.22	46,071	0.08
Czechoslovakia	130	156	245	356	427	671	+ 57.1	0.01	0.01	0.01	4,011	0.01
France	513	367	206	1,406	1,006	565	— 43.8	0.02	0.01	0.01	13,467	0.02
Germany	3,861	4,500	4,029	10,578	12,329	11,038	— 10.5	0.19	0.16	0.13	87,029	0.16
Great Britain	.....	412	351	.....	1,129	962	— 14.8	.....	0.02	0.01	3,809	0.01
Hungary	288	5,146	4,330	789	14,099	11,863	— 15.9	0.01	0.19	0.15	38,553	0.07
Italy	101	76	80	277	208	219	+ 5.3	0.01	.....	.....	3,372	0.01
Netherlands	.....	10	1,478	.....	27	4,049	+	.....	.....	0.05	1,543	.....
Poland	3,763	860	944	10,310	2,356	2,586	+ 9.8	0.19	0.03	0.03	276,436	0.50
Roumania	48,487	31,206	28,773	132,841	85,496	78,830	— 7.8	2.44	1.14	0.96	1,157,879	2.11
U. S. S. R. (Russia)	204,956	164,000	172,000	561,523	449,315	471,233	+ 4.9	10.31	5.96	5.73	5,791,712	10.56
Yugoslavia	9	10	365	25	27	1,000	+	.....	.....	0.01	461	.....
Total Europe	263,243	212,842	219,850	721,214	583,129	602,329	+ 3.3	13.24	7.74	7.32	7,433,747	13.55
AFRICA—												
Egypt	1,581	9,070	9,310	4,331	24,849	25,507	+ 2.6	0.08	0.33	0.31	107,790	0.20
Other Africa	27	20	22	74	55	60	+ 9.1	.....	.....	.....	430	.....
Total Africa	1,608	9,090	9,332	4,405	24,904	25,567	+ 2.7	0.08	0.33	0.31	108,220	0.20
ASIA, Middle East—												
Bahrein	8,298	8,010	9,411	22,734	21,945	25,784	+ 17.5	0.42	0.29	0.31	88,000	0.16
Iran	78,372	146,614	154,861	214,718	401,682	424,277	+ 5.6	3.94	5.33	5.16	1,747,940	3.18
Iraq	32,643	35,665	33,478	89,433	97,713	91,720	— 6.1	1.64	1.30	1.11	382,765	0.70
Kuwait	.....	5,931	16,227	.....	16,249	44,458	+173.6	.....	0.21	0.54	22,158	0.04
Saudi Arabia	495	59,944	89,852	1,356	164,230	246,170	+ 49.9	0.03	2.18	2.99	202,198	0.37
Total Middle East	119,808	256,164	303,829	328,241	701,819	832,409	+ 18.6	6.03	9.31	10.11	2,443,061	4.45
ASIA, Far East—												
Borneo, British (Sarawak & Brunei)	6,913	2,100	13,171	18,940	5,753	36,085	+527.2	0.35	0.08	0.44	138,903	0.26
Burma	7,538	700	810	20,652	1,918	2,219	+ 15.7	0.38	0.03	0.03	335,143	0.61
India	2,488	2,193	2,190	6,816	6,008	6,000	— 0.1	0.12	0.08	0.07		
China	.....	513	377	.....	1,405	1,033	— 26.5	.....	0.02	0.01	2,767	0.01
Formosa (Taiwan)	*	16	18	.....	44	49	+ 11.4	.....	.....	.....	*233	.....
Japan	*2,511	1,343	1,310	6,879	3,680	3,589	— 2.5	0.13	0.05	0.04	*93,922	0.17
Netherlands Indies	57,318	2,100	8,058	157,036	5,753	22,077	+283.7	2.88	0.08	0.27	1,142,703	2.08
Sakhalin	3,821	6,000	6,800	10,469	16,439	18,630	+ 13.3	0.19	0.21	0.23	73,040	0.13
Total Far East	80,589	14,965	32,734	220,792	41,000	89,682	+118.7	4.05	0.55	1.09	1,786,711	3.26
ASIA, Total	200,397	271,129	336,563	549,033	742,819	922,091	+ 24.1	10.08	9.86	11.20	4,229,772	7.70
AUSTRALIA-NEW ZEALAND	4	2	1	11	6	3	— 50.0	.....	.....	.....	39	.....
WORLD, Undistributed	4	.....	.....	11	.....	.....	.....	.....	.....	.....	1,044	.....
TOTAL WORLD	1,988,041	2,750,705	3,004,424	5,446,688	7,536,178	8,231,299	+ 9.2	100.00	100.00	100.00	54,869,524	100.00

* Formosa included with Japan prior to 1941.

Specialists In...

PIPE LINE



THOMAS R. JONES

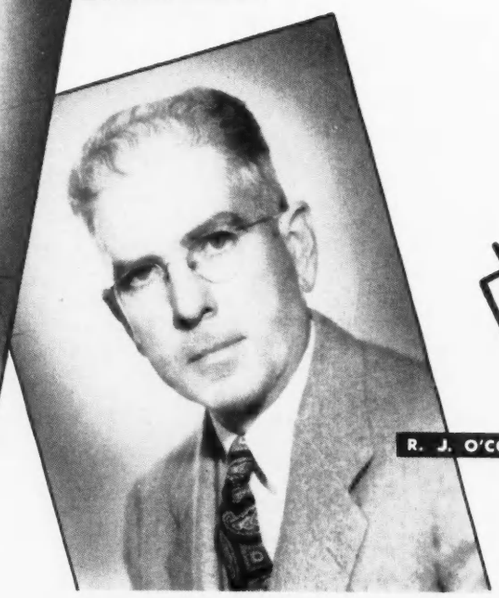
TALMAGE A. HESTER

EXPERIENCE . . . in producing "The Best in Pipe Line Construction." Oklahoma Contracting backs this statement by 30 years of practical experience in engineering and laying over 30,000 miles of pipe including the major sections of the world's greatest pipe lines.

SPECIALISTS with vast resources of engineering knowledge, modern equipment, skilled personnel ready to undertake your job regardless of location or difficulty. For your next job call Oklahoma Contracting, the company with experience, integrity, and equipment. Get an "OK" job.

PAUL R. HALBERT

NELSON K. McFARLAND



R. J. O'CONNELL

OKLAHOMA CONT

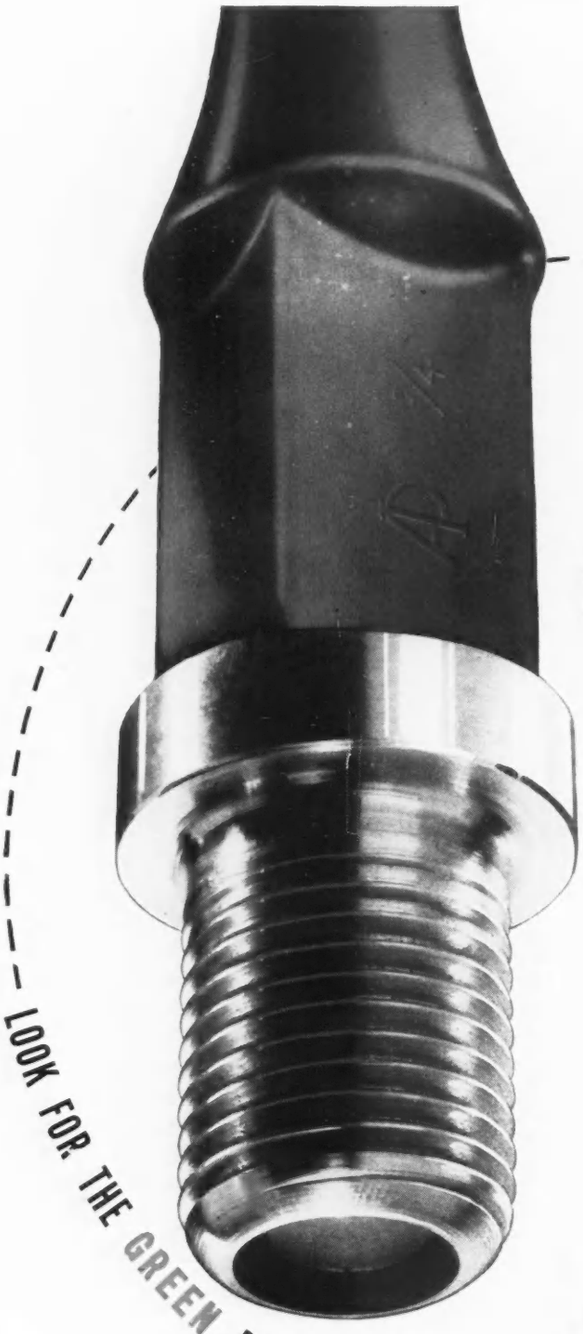
MERCANTILE BANK BUILDING

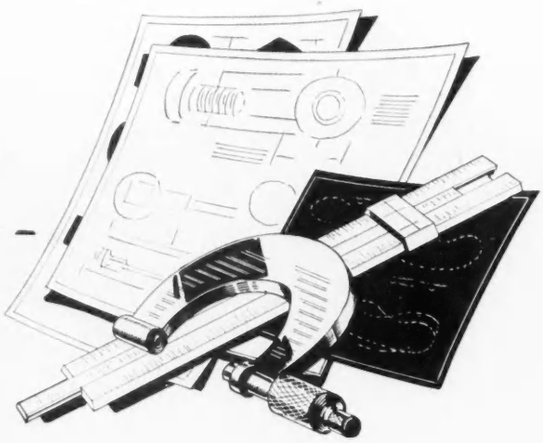
World Crude Oil Production, By Countries, By Years (Part 1)

(Complete production history of world, in thousands of barrels of 42 U. S. Gallons. Sources: *Mineral Resources and Minerals Yearbook*, except as otherwise indicated)

YEAR	World Total	Percent Produced by U.S.	NORTH AMERICA					SOUTH AMERICA									
			Canada	Mexico	United States	Cuba	Total North America	Argentina	Bolivia	Brazil	Chile	Colombia	Ecuador	Peru	Trinidad	Venezuela	Total South America
1857	2	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1858	4	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1859	6	31	.....	.....	2	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1860	509	98	.....	.....	500	.....	500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1861	2,131	99	.....	.....	2,114	.....	2,114	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1862	3,092	99	12	.....	3,057	.....	3,069	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1863	2,763	94	83	.....	2,611	.....	2,694	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1864	2,304	92	90	.....	2,116	.....	2,206	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1865	2,716	92	110	.....	2,498	.....	2,608	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1866	3,899	92	175	.....	3,598	.....	3,773	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1867	3,709	90	190	.....	3,347	.....	3,537	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1868	3,990	91	200	.....	3,646	.....	3,846	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1869	4,696	90	220	.....	4,215	.....	4,435	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1870	5,799	91	250	.....	5,261	.....	5,511	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1871	5,730	91	270	.....	5,205	.....	5,475	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1872	6,877	92	308	.....	6,293	.....	6,601	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1873	10,838	91	365	.....	9,894	.....	10,259	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1874	11,933	92	169	.....	10,927	.....	11,096	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1875	9,977	88	220	.....	8,788	.....	9,008	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1876	11,051	83	312	.....	9,133	.....	9,445	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1877	15,754	85	312	.....	13,350	.....	13,662	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1878	18,417	84	312	.....	15,397	.....	15,709	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1879	23,601	84	575	.....	19,914	.....	20,489	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1880	30,018	88	350	.....	26,286	.....	26,636	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1881	31,993	86	275	.....	27,661	.....	27,936	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1882	35,704	85	275	.....	30,350	.....	30,625	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1883	30,255	78	250	.....	23,450	.....	23,700	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1884	35,969	67	250	.....	24,218	.....	24,468	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1885	36,765	59	250	.....	21,859	.....	22,109	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1886	47,243	59	584	.....	28,065	.....	28,649	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1887	47,807	59	526	.....	28,283	.....	28,809	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1888	52,165	53	695	.....	27,612	.....	28,307	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1889	61,507	57	705	.....	35,164	.....	35,869	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1890	76,633	60	795	.....	45,824	.....	46,619	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1891	91,100	60	755	.....	54,293	.....	55,048	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1892	88,739	57	780	.....	50,515	.....	51,295	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1893	92,038	53	798	.....	48,431	.....	49,229	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1894	89,337	55	829	.....	49,344	.....	50,173	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1895	103,692	51	726	.....	52,892	.....	53,618	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1896	114,199	53	727	.....	60,960	.....	61,687	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1897	121,993	50	710	.....	60,476	.....	61,186	.....	.....	.....	.....	.....	.....	47	.....	.....	47
1898	124,979	44	758	.....	55,364	.....	56,122	.....	.....	.....	.....	.....	.....	71	.....	.....	71
1899	131,147	44	808	.....	57,071	.....	57,879	.....	.....	.....	.....	.....	.....	71	.....	.....	71
1900	149,137	43	913	.....	63,621	.....	64,534	.....	.....	.....	.....	.....	.....	89	.....	.....	89
1901	167,440	41	757	10	69,389	.....	70,156	.....	.....	.....	.....	.....	.....	274	.....	.....	274
1902	181,809	49	531	40	88,767	.....	89,338	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1903	194,879	52	487	75	100,461	.....	101,023	.....	.....	.....	.....	.....	.....	275	.....	.....	275
1904	217,948	54	553	126	117,081	.....	117,760	.....	.....	.....	.....	.....	.....	287	.....	.....	287
1905	215,091	63	634	251	134,717	.....	135,602	.....	.....	.....	.....	.....	.....	278	.....	.....	278
1906	213,263	59	569	502	126,494	.....	127,565	.....	.....	.....	.....	.....	.....	290	.....	.....	290
1907	263,957	63	789	1,005	166,095	.....	167,889	*	.....	.....	.....	.....	.....	373	.....	.....	373
1908	285,287	63	528	3,933	178,527	.....	182,988	12	.....	.....	.....	.....	.....	531	.....	.....	531
1909	298,709	61	421	2,714	183,171	.....	186,306	18	.....	.....	.....	.....	.....	751	.....	.....	751
1910	327,763	64	316	3,634	209,557	.....	213,507	20	.....	.....	.....	.....	.....	945	*	.....	957
1911	344,361	64	291	12,553	220,449	.....	233,293	13	.....	.....	.....	.....	.....	1,411	57	.....	1,486
1912	352,443	63	243	16,558	222,935	.....	239,736	47	.....	.....	.....	.....	.....	1,258	143	.....	1,421
1913	385,345	64	228	25,696	248,446	.....	274,370	131	.....	.....	.....	.....	.....	1,465	285	.....	1,763
1914	407,544	65	215	26,235	265,763	.....	292,213	276	.....	.....	.....	.....	.....	1,752	437	.....	2,236
1915	432,033	65	215	32,911	281,104	.....	314,230	513	.....	.....	.....	.....	.....	2,071	504	.....	2,706
1916	457,500	66	198	40,546	300,767	.....	341,511	867	.....	.....	.....	.....	.....	1,837	644	.....	2,757
1917	502,891	67	214	55,293	335,316	.....	390,823	1,218	.....	.....	.....	.....	.....	2,579	750	.....	3,842
1918	503,515	71	305	63,828	355,928	.....	420,061	1,353	.....	.....	.....	57	.....	2,593	929	.....	4,389
1919	555,875	68	241	87,073	378,367	.....	465,681	1,331	.....	.....	.....	†60	.....	2,577	1,602	120	5,574
1920	688,884	64	196	157,069	442,929	.....	600,194	1,651	.....	.....	.....	†60	.....	2,527	2,082	333	6,355
1921	766,002	62	188	193,398	472,183	.....	665,769	2,036	.....	.....	.....	†60	.....	2,628	1,841	425	6,285
1922	858,898	65	179	182,278	557,531	.....	739,988	2,866	.....	.....	67	†60	3,699	2,817	2,083	457	7,068
1923	1,015,736	72	170	149,585	732,407	.....	882,162	3,400	.....	.....	323	†60	5,314	3,699	2,354	1,433	9,649
1924	1,014,318	70	161	139,678	713,940	.....	853,779	4,639	.....	.....	425	87	5,699	5,314	2,445	2,201	13,209
1925	1,068,933	71	332	115,515	763,743	.....	879,590	6,336	.....	.....	445	†100	8,379	5,699	3,051	4,201	16,863
1926	1,096,823	70	364	90,421	770,874	.....	861,659	7,851	.....	.....	1,007	160	9,232	4,057	4,387	19,687	40,809
1927	1,262,582	71	477	64,121	901,129	.....	965,727	8,630	.....	.....	6,444	214	10,762	8,379	4,971	36,911	67,153
1928	1,324,774	68	624	50,151	901,474	.....	952,249	9,070	.....	.....	15,014	537	10,127	10,762	5,380	63,134	102,822
1929	1,485,867	68	1,117	44,688	1,007,323	.....	1,053,128	9,391	*	.....	19,897	1,084	12,006	12,127	7,684	105,749	155,490
1930	1,410,037	64	1,522	39,530	898,011	.....	939,063	9,002	56	.....	20,385	1,381	13,422	12,006	8,716	137,472	190,767
1931	1,372,532	62	1,543	33,039	851,081	.....	885,663	11,709	25	.....	20,346	1,553	12,449	12,449	9,419	136,669	189,494
1932	1,309,677	60	1,044	32,805	785,159	.....	819,008	13,139	44	.....	18,237	1,762	10,089	9,744	116,613	168,179
1933	1,442,146	63	1,145	34,001	905,656	23	940,825	13,691	112	.....	16,414	1,597	9,899	10,126	116,541	167,760
1934	1,522,281	60	1,417	38,172	908,065	28	947,682	14,024	159	.....	13,158	1,620	13,257	9,561	117,720	169,119	
1935	1,654,488	60	1,447	40,241	996,596	47	1,038,331	14,297	164	.....	17,341	1,637	16,314	10,894	136,103	196,472	
1936	1,791,540	61	1,500	41,028	1,099,687	62	1,142,277	15,458	105	.....	17,598	1,732	17,067	11,671	148,254	210,783	
1937	2,039,231	63	2,944	46,907	1,279,160	33	1,329,044	16,355	122	.....	18,756	1,942	17,593	13,237	154,794	221,885	
1938	1,988,041	61	6,966	38,506	1,214,355	78	1,259,905	17,076	226	.....	20,599	2,161	17,457	15,303	186,230	258,427	
1939	2,086,160	60.6	7,838	42,898	1,264,962	112	1,315,810	18,613	215	.....	21,582	2,246	15,839	17,737	188,174	262,880	
1940	2,149,821	62.9	8,591	44,036	1,353,214	142	1,405,983	20,609	288	2	23,857	2,313	13,508	19,270	206,470	284,246	
1941	2,220,657	63.1	10,134	42,196	1,402,228	150	1,454,708	21,873	235	3	25,593	2,349	12,126	22,227	185,570	268,764	
1942	2,093,083	66.2	10,365	34,815	1,386,645	150	1,431,975	23,704	308	33	24,553	1,557	11,935	20,506	228,430	309,092	
1943	2,256,652	66.7	10,052	35,163	1,505,613	150	1,550,978	27,714	334	48	10,487	2,278	13,629	22,069	147,675	220,183	
1944	2,550,954	65.8	10,099	38,203	1,677,904	150	1,726,356	24,230	314	58	13,261	2,315	14,654	21,385	177,631	257,342	
1945	2,594,407	66.1	8,483	43,547	1,713,655	150	1,765,835	22,881	382	79	22,291	2,967	14,386	22,139	257,046	343,431	
1946	2,750,705	63.0	7,668	49,235	1,733,939	150	1,790,992	20,604	363	67	22,449	2,664	13,744	21,093	323,156	406,448	
1947‡	3,004,424	61.8	7,722	55,917	1,856,107	280	1,920,026	21,846	375	97	22,118	2,323	12,456	20,233	388,486	466,650	
Total	54,869,524	63.9	128,955	2,290,126	35,082,509	1,705	37,503,295	388,494	3,827	387	25,882	2,282	12,764	20,521	434,885	518,652	
											418,529	41,218	357,603	351,737	4,031,612	5,593,407	

* Less than 1,000 barrels. † Approximate production. ‡ Compiled by WORLD OIL.





Specialized Experience

Because this organization concentrates its attention on the design, production, application of sucker rods, it is only natural for the industry to look to us for specialized knowledge of our products and their application. This specialization created the first all metal sucker rod. It has brought about a long string of other and equally important "firsts"... advancements and improvements that have helped make sucker rod pumping more efficient—more productive—and more economical.

LOOK FOR THE GREEN RODS

● *Write for booklet on the "Care and Handling of Sucker Rods" as well as your copy of a folder describing the new Snap-Tite Wrench.*

JONES SUCKER RODS

THE S. M. JONES COMPANY
(Subsidiary of Buffalo Bolt Company)
General Office and Factory: TOLEDO, OHIO
Sales Office: Kennedy Building, Tulsa, Okla.
Export Sales Office: Buffalo International Corp.
50 Church Street, N. Y. C.

World Crude Oil Production, By Countries, By Years (Part 2)

(Complete production history of world, in thousands of barrels of 42 U. S. Gallons. Sources: *Mineral Resources and Minerals Yearbook*, except as otherwise indicated)

	EUROPE														AFRICA			
YEAR	Albania	Austria	Czecho-slovakia	Great Britian	France	Ger-many	Hun-gary	Italy	Nether-lands	Poland	Rou-mania	‡U.S.S.R. (Russia)	Yugo-slavia	‡Total Europe	Egypt	Algeria	Other Africa	Total Africa
1857											2			2				
1858											4			4				
1859											4			4				
1860								*			9			9				
1861								*			17			17				
1862								*			23			23				
1863								*			28	41		69				
1864								*			33	65		98				
1865								2			39	67		108				
1866								1			42	83		126				
1867								1			51	120		172				
1868								*			56	88		144				
1869								*			59	202		261				
1870								*			84	204		288				
1871								*			90	165		255				
1872								*			91	185		276				
1873								*			104	475		579				
1874								1		150	103	583		837				
1875								1		158	108	697		964				
1876								3		164	111	1,321		1,599				
1877								3		170	108	1,801		2,082				
1878								4		176	109	2,401		2,690				
1879								3		215	110	2,761		3,089				
1880						9		2		229	115	3,001		3,356				
1881						29		1		287	122	3,601		4,040				
1882						58		2		330	136	4,538		5,064				
1883						27		2		365	139	6,002		6,535				
1884						46		3		408	211	10,805		11,473				
1885						41		2		465	193	13,925		14,626				
1886						74		2		306	168	18,006		18,556				
1887						74		1		344	182	18,368		18,969				
1888						85		1		467	219	23,049		23,821				
1889						68		1		515	298	24,609		25,491				
1890						108		3		659	383	28,691		29,844				
1891						109		8		631	488	34,573		35,809				
1892						101		18		646	593	35,775		37,133				
1893						100		19		693	535	40,457		41,804				
1894						123		21		949	508	36,375		37,976				
1895						121		26		1,453	576	46,140		48,316				
1896						145		18		2,444	543	47,221		50,371				
1897						166		14		2,226	571	54,399		57,376				
1898						184		15		2,376	776	61,610		64,961				
1899						192		16		2,314	1,426	65,955		69,903				
1900						358		12		2,347	1,629	75,780		80,126				
1901						314		16		3,251	1,678	85,168		90,427				
1902						354		19		4,142	2,060	80,540		87,115				
1903						446		18		5,235	2,763	75,591		84,053				
1904						637		26		5,947	3,599	78,537		88,746				
1905						561		44		5,766	4,421	54,960		65,752				
1906						579		54		5,468	6,378	58,897		71,376				
1907						757		60		8,456	8,118	61,851		79,242				
1908						1,009		51		12,612	8,252	62,187		84,111				
1909						1,019		42		14,933	9,327	65,970		91,291				
1910						1,032		51		12,673	9,724	70,337		93,817				
1911						1,017		75		10,519	11,108	66,184		88,903	21			21
1912						1,031		54		8,535	12,976	68,019		90,615	214			214
1913						857		47		7,818	13,555	62,834		85,111	98			98
1914						781		40		6,436	12,827	67,020		87,104	753	1		754
1915						703		44		5,352	12,030	68,548		86,677	212	4		216
1916						656		51		6,587	8,945	65,817		82,056	404	8		412
1917					§	642		41		6,228	3,721	63,072		73,704	943	9		952
1918					363	270		35		6,032	8,730	27,168		42,598	1,935	7		1,942
1919			48	2	334	265		35		6,096	6,618	31,752		45,150	1,517	5		1,522
1920			69	3	356	246		35		5,607	7,135	25,430		39,181	1,042	4		1,046
1921			94	3	389	274		32		5,167	8,368	28,968		43,295	1,255	3		1,258
1922			120	1	496	319		31		5,227	9,843	35,692		51,729	1,188	9		1,197
1923			74	1	494	346		34		5,402	10,867	39,147		56,365	1,054	9		1,063
1924			76	2	497	406		39		5,657	13,369	45,355		65,401	1,122	11		1,133
1925			158	3	459	541		61		5,960	16,650	52,448		76,280	1,226	12		1,238
1926			150	2	478	653		41		5,844	23,314	64,311		94,793	1,188	9		1,197
1927			112	2	504	663		47		5,342	26,368	77,018		110,056	1,267	8		1,275
1928			94	1	512	630		46		5,492	30,773	†84,745		122,293	1,842	8		1,850
1929			93		535	704		45		4,988	34,758	†99,507		140,630	1,868	20		1,888
1930			157	*	523	1,182		59		4,904	41,624	†125,555		174,004	1,996	16		2,012
1931			134	★	520	1,606		124		4,662	49,127	162,842		219,015	2,038	★		2,038
1932			126	★	530	1,608		208		4,116	53,815	154,367		214,770	1,895	★		1,895
1933	11		122	★	562	1,665		204		4,072	54,020	154,840		215,496	1,663	★		1,663
1934	10		178	★	557	2,187		151		3,913	62,063	174,318		243,377	1,546	★		1,546
1935	41	44	133	★	541	2,996		119		3,812	61,310	182,386	2	251,384	1,301	★	4	1,305
1936	273	50	127	★	503	3,115		123		3,789	63,659	186,206	1	257,846	1,278	★	4	1,282
1937	619	221	123	★	502	3,176	16	110		3,716	52,452	193,241	4	254,180	1,196	★	22	1,218
1938	752	383	130	★	513	3,861	288	101		3,763	48,487	204,956	9	263,243	1,581	★	27	1,608
1939	934	1,240	120		500	4,487	1,103	91		3,898	45,648	216,866	10	274,897	4,666	★	27	4,693
1940	1,497	2,808	163	124	496	7,371	1,881	85		3,891	43,168	218,600	10	280,094	6,505	★	27	6,532
1941	1,334	4,238	183	223	414	6,303	3,183	95		1,793	40,517	238,150	10	296,443	8,546	★	27	8,573
1942	1,601	5,899	271	605	463	5,191	5,037	101		2,794	42,094	227,470	10	291,536	8,275	★	27	8,302
1943	1,001	7,478	200	839	356	4,973	6,347	75		3,500	39,182	200,750	10	264,711	8,953	★	25	8,978
1944	334	8,218	185	703	300	5,049	6,204	75	14	3,000	26,191	235,000	10	285,283	9,416	★	30	9,446
1945	267	3,074	170	532	197	3,800	5,018	75	41	750	34,772	148,953	10	197,659	9,406	★	25	9,431
1946	365	5,734	156	412	367	4,500	5,146	76	10	860	31,206	164,000	10	212,842	9,070	★	20	9,090
1947Ⅱ	365	6,684	245	351	206	4,029	4,330	80	1,478	944	28,773	172,000	365	219,850	9,310	1	21	9,332
Total	9,404	46,071	4,011	3,809	13,467	87,029	38,553	3,372	1,543	276,436	1,157,879	5,791,712	461	7,433,747	107,790	144	286	108,220

‡ Includes field in Russian Asia other than Sakhalin. * Less than 1,000 barrels. ★ No more data available. § France's earlier production credited to Germany. † Year ended September 30. Ⅱ Compiled by WORLD OIL.

Cut your exploration DRILLING COSTS JUST LIKE THIS...

Here are the results of a 6-month comparative test made by a major seismograph party using two drills. The same drillers operated the same drills in the same formations — 50% rock (limestone outcrops and Miocene sandstone) and 50% sticky clay and shale. They drilled average depths of 70′ using 3⅞″ bits. The first three months they used conventional drag bits and the second three months, Hawthorne Replaceable Blade Rock Cutter Bits.

Bit records showing a one-month average for each drill are tabulated below.

Bit Record and Costs for Average Month with CONVENTIONAL DRAG BITS

Total Footage	Total Holes	Roller Bits Used	Drag Bits Used	Roller Bit Footage	Drag Bit Footage	Roller Bit Costs	Drag Bit Costs	All Bit Costs Total Cost	All Bit Costs Per Foot
4200	60	5	60	2100	2100	$425.00	$270.00	$695.00	.1655

Bit Record and Costs for Average Month with HAWTHORNE REPLACEABLE BLADE ROCK CUTTER BITS

Total Footage	Total Holes	Roller Bits Used	Hawthorne Bits Used	Roller Bit Footage	Hawthorne Bit Footage	Roller Bit Costs	Hawthorne Bit Costs	All Bit Costs Total Cost	All Bit Costs Per Foot
5600	80	2	1 bit with 12 sets Blades	840	4670	$170.00	$203.40	$373.40	.0677

AVERAGE SAVINGS PER MONTH FOR EACH DRILL

Savings on bit costs and service $321.60

Value of additional footage obtained each month with Hawthorne Replaceable Blade Rock Cutter Bits:

20 Holes (70′ each @ 75c per foot or $52.50 each, less bit service of $11.58 each)...@ $40.92 each 818.40

***Total Monthly Savings per Drill with Hawthorne Rock Cutter Bits* $1,140.00**

NOTE: Cost of $203.40 for Hawthorne Replaceable Blade Bits includes one complete bit assembly and one extra locking bowl. Conventional bit service is $4.50 for each dressing of bit. Roller bit service is $85.00 each. Even though in use more than three months, the Hawthorne Bit Assembly was capable of drilling many more feet of hole.

The above records show that Hawthorne Replaceable Blade Bits provided a total saving and extra value of $2,280.00 per month for the two drills.

This is just one example! Many operators are reporting savings that are just as impressive. If you want savings like this, write for our bit catalog today.

Increase the EFFICIENCY of your present drills **33⅓%** *with these* **ROCK CUTTER BLADES**

Hawthorne Replaceable Blade Bit and ***Rock Cutter*** Blades with Reamer and Stabilizer.

HERB J. HAWTHORNE INC.

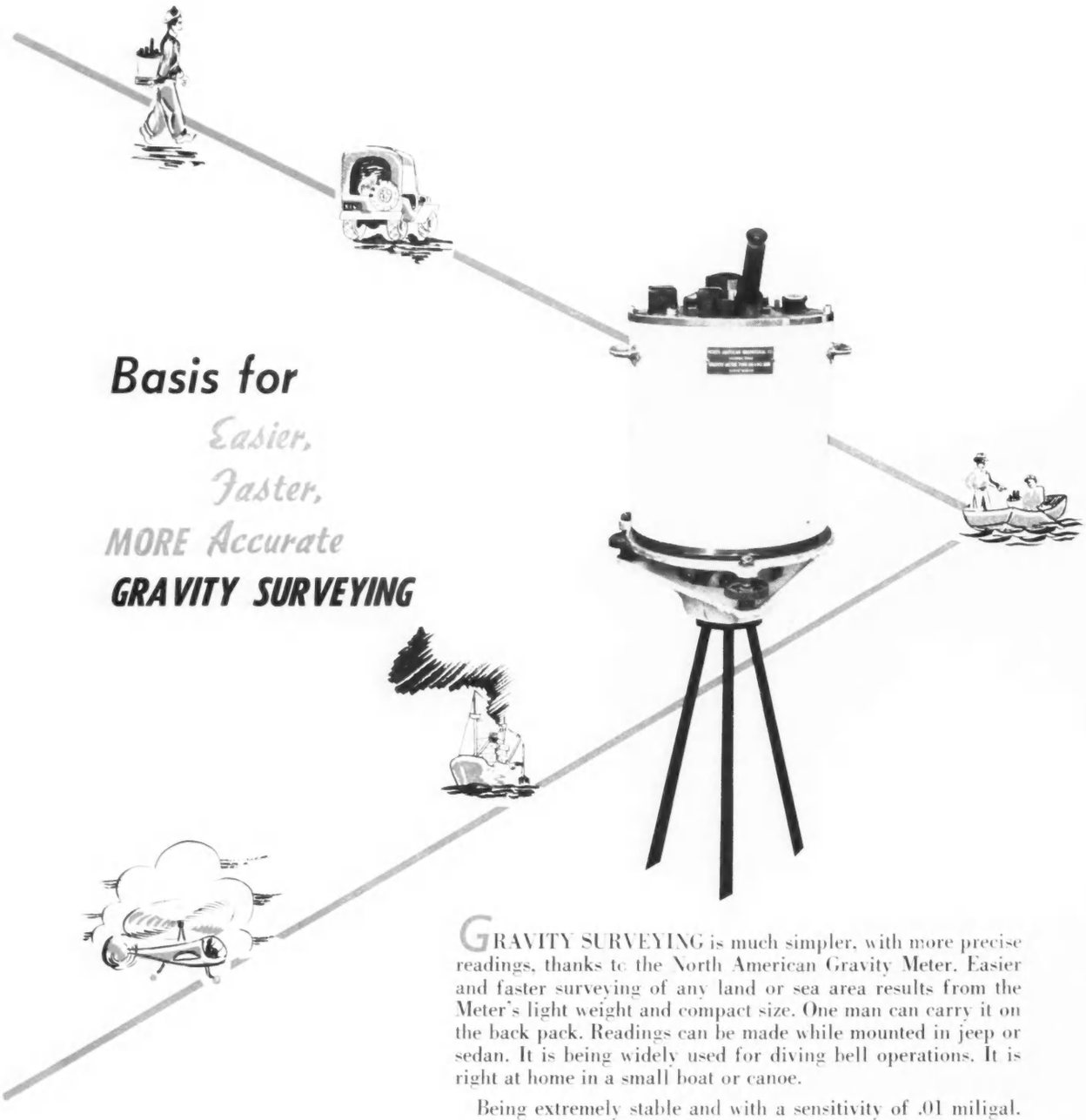
P. O. BOX 7299 HOUSTON 8, TEXAS

World Crude Oil Production, By Countries, By Years (Part 3)

(Complete production history of world, in thousands of barrels of 42 U. S. Gallons. Sources: *Mineral Resources and Minerals Yearbook*, except as otherwise indicated)

	ASIA—Middle East						ASIA—Far East											
Year	Bahrein	Iran	Iraq	Kuwait	Saudi Arabia	Total Middle East	British Borneo	‡India	‡ Burma	China	¶ Formosa (Taiwan)	Japan	Nether-land India	Sak-halin	Total Far East	*Total Asia	Austra-lia-New Zealand	Rest of World
1857																		
1858																		
1859																		
1860																		
1861																		
1862																		
1863																		
1864																		
1865																		
1866																		
1867																		
1868																		
1869																		
1870																		
1871																		
1872																		
1873																		
1874																		
1875												5			5	5		
1876												7			7	7		
1877												10			10	10		
1878												18			18	18		
1879												23			23	23		
1880												26			26	26		
1881												17			17	17		
1882												15			15	15		
1883												20			20	20		
1884												28			28	28		
1885												30			30	30		
1886												38			38	38		
1887												29			29	29		
1888												37			37	37		
1889								94				53			147	147		
1890								118				52			170	170		
1891								190				53			243	243		
1892								242				69			311	311		
1893								299				106	600		1,005	1,005		
1894								327				173	688		1,188	1,188		
1895								372				170	1,216		1,758	1,758		
1896								430				237	1,427		2,094	2,094		
1897								546				262	2,552		3,360	3,360		
1898								542				319	2,964		3,825	3,825		
1899								941				539	1,796		3,276	3,276		
1900								1,079				871	2,253		4,203	4,203		
1901								1,431				1,117	4,014		6,562	6,562		20
1902								1,617				996	2,430		5,043	5,043		26
1903								2,510				1,200	5,770		9,489	9,489		36
1904								3,385				1,219	6,508		11,112	11,112		40
1905								4,137				1,347	7,850		13,334	13,334		30
1906								4,016				1,564	8,181		13,761	13,761		30
1907								4,344				1,718	9,983		16,045	16,045		30
1908								5,047				1,871	10,283		17,201	17,201		30
1909								6,677				1,887	11,042		19,606	19,606		20
1910								6,138				1,829	11,031		18,998	18,998		20
1911								6,451				1,737	12,173		20,361	20,361		20
1912								7,117				1,659	10,846		19,622	19,622		20
1913		1,857				1,857	141	7,930				1,940	11,172		21,183	23,040		20
1914		2,910				2,910	318	7,410				2,636	11,422		21,786	24,696		20
1915		3,616				3,616	392	8,202				2,928	11,920		23,442	27,058		10
1916		4,477				4,477	629	8,491				2,963	12,547		24,630	29,107		25
1917		7,147				7,147	542	8,079				2,861	13,180		24,662	31,809		29
1918		8,623				8,623	504	8,188				2,441	12,778		23,911	32,534		25
1919		10,139				10,139	596	8,736				2,238	15,508		27,078	37,217		20
1920		12,230				12,230	1,020	8,375				2,221	17,529		29,145	41,375		20
1921		16,673				16,673	1,411	8,734				2,233	16,958	2	29,338	46,011		20
1922		22,247				22,247	2,849	8,529				2,055	17,066	7	30,506	52,753		22
1923		25,230				25,230	3,940	8,406				1,804	19,870	9	34,029	59,259		24
1924		32,373				32,373	4,163	8,416				1,814	20,473	80	34,946	67,319		24
1925		35,038				35,038	4,257	8,274				1,915	21,422	87	35,955	70,993		23
1926		35,842				35,842	4,942	8,011				1,785	21,243	181	36,162	72,004		17
1927		39,688	338			40,026	4,943	8,032				1,789	27,459	440	42,663	82,689		13
1928		43,461	713			44,174	§5,223	8,741				1,944	32,118	677	48,703	92,877		15
1929		42,145	798			42,943	5,290	8,747				2,023	39,279	‡1,134	56,473	99,416		38
1930		45,828	913			46,741	4,907	8,292				1,950	41,729	‡1,805	58,683	105,424		40
1931		44,376	830			45,206	3,854	8,200				2,050	35,539	2,734	52,377	97,583		54
1932		49,471	836			50,307	3,796	8,817				1,630	39,001	2,631	55,875	106,182		62
1933	31	54,392	917			55,340	4,490	8,743				1,455	42,606	2,338	59,632	114,972		71
1934	285	57,851	7,689			65,825	5,140	10,503				1,834	46,925	2,881	67,283	133,108		96
1935	1,265	57,273	27,408			85,946	5,546	2,038	7,181			2,249	47,171	2,545	66,730	152,676	5	4
1936	4,645	62,718	30,406		20	97,789	5,209	1,978	7,588			2,440	50,025	3,212	70,452	168,241	5	4
1937	7,762	77,804	31,836		65	117,467	6,009	2,162	7,848			2,488	56,724	3,656	78,887	196,354	4	4
1938	8,298	78,372	32,643		495	119,808	6,913	2,488	7,538			2,511	57,318	†3,821	80,589	200,397	4	4
1939	7,589	78,151	30,791		3,934	120,465	7,097	2,327	7,873	4		2,654	62,087	4,000	86,042	206,507	3	4
1940	7,074	66,317	24,225		5,075	102,691	7,047	2,302	7,731	10		2,639	62,011	4,000	85,740	188,431	3	14
1941	6,794	50,777	12,650		4,310	74,531	6,864	2,899	7,762	87	62	1,929	53,704	4,000	77,307	151,338	3	
1942	6,241	72,256	19,726		4,530	102,753	3,000	2,792	2,500	340	48	1,652	24,000	4,000	38,332	141,085	2	
1943	6,572	74,612	24,848		4,868	110,900	4,500	2,735	1,000	447	38	1,727	48,294	5,000	63,741	174,641	2	
1944	6,714	102,045	30,943		7,794	147,496	6,000	2,784	750	505	40	1,601	22,260	5,000	38,940	186,436	2	
1945	7,309	130,526	35,112		21,311	194,258	2,100	2,343	725	484	11	1,510	7,600	6,000	20,773	215,031	3	
1946	8,010	146,614	35,665	5,931	59,944	256,164	2,100	2,193	700	513	16	1,343	2,100	6,000	14,965	271,129	2	
1947‡	9,411	154,861	33,478	16,227	89,852	303,829	13,171	2,190	810	377	18	1,310	8,058	6,800	32,734	336,563	1	
Total	88,000	1,747,940	382,765	22,158	202,198	2,443,061	138,903	335,143		2,767	233	93,922	1,142,703	73,040	1,786,711	4,229,772	39	71,004

‡ Separation of British India and Burma prior to 1935 not available from U. S. Bureau of Mines data here used. Data by L. Dudley Stamp in "Petroleum Development and Technology, 1933," and in A.I.M.E. "Transactions" indicate cumulatives through 1934 as follows: Burma 184,528, India 20,756. * Exclusive of U.S.S.R. fields in Asia, other than Sakhalin, which are included with U.S.S.R. in Europe. ‡ Year ended September 30. † Approximate production. § Beginning of production in Brunei. ¶ Formosa included with Japan prior to 1941. ‡ Compiled by WORLD OIL.



Basis for

Easier, Faster, MORE Accurate GRAVITY SURVEYING

GRAVITY SURVEYING is much simpler, with more precise readings, thanks to the North American Gravity Meter. Easier and faster surveying of any land or sea area results from the Meter's light weight and compact size. One man can carry it on the back pack. Readings can be made while mounted in jeep or sedan. It is being widely used for diving bell operations. It is right at home in a small boat or canoe.

Being extremely stable and with a sensitivity of .01 miligal. the North American Gravity Meter assures readings of greater accuracy, than is usual for surveys of this type.

It will pay you to use the North American Gravity Meter for your gravity surveying. Write for details of our sale and lease plans.

NORTH AMERICAN GEOPHYSICAL COMPANY

Manufacturers of Geophysical Equipment and Precision Apparatus

2627 Westheimer Keystone 3-7408
HOUSTON 6, TEXAS

WORLD CRUDE RESERVES

THE world's proved but unproduced reserves of crude oil at the end of 1947 are estimated to total 61,683,035,000 barrels, 20½ times greater than the amount produced during 1947. This volume represents a gain of approximately 3 billion barrels during the preceding 12 months, although a record quantity of almost 3 billion barrels were produced during 1947, and indicates that 6 billion barrels of new oil were proved to exist by developments in the year.

These figures represent only those reserves considered to be actually proved by drilling developments. Not included is a substantial amount recognized by many as being probable. This is particularly true in the Middle East countries, where an additional reserve of perhaps as much as 10½ billion barrels may be classified as probable. Also excluded is a reserve of about 3½ billion barrels of condensate and other natural gas liquids known to exist in the United States. The figure consists entirely of crude oil.

Almost 35 percent of the estimated proved reserves are located in the United States, where production in 1947 was 61 percent of the world output. United States crude reserves are estimated at 21,487,685,000 barrels, or 11.6 times greater than the 1,856,107,000 barrels produced during 1947. This is the smallest ratio of reserves to annual production of any of the world's principal producing areas. In contrast, the collective reserve of all areas outside of the United States is 26 times bigger than their production during 1947. Even the world as a whole has 20.5 times as much crude in known reserves as it produced during the year.

Crude reserve figures clearly indicate why the Middle East is expected to supply a substantially greater quantity of oil in the future. The Middle East countries, without including a large amount of probable reserves, have a proved reserve almost as great as that of the United States. Yet production from the Middle East during 1947 was less than one-sixth the amount produced by the United States. The reserves of these countries (Bahrein, Iran, Kuwait, Qatar and Saudi Arabia) are estimated at 19,505,000,000 barrels, or 31 percent of the world total. In contrast, the Middle East produced only 10 percent of the world's 1947 production. At 1947 withdrawal rates, each barrel of the Middle East production was backed up by at least 64 barrels of additional oil.

Largest single reserve in the Middle East is the 5,626,000,000 barrels credited to Iran, or 9 percent of the world total. This volume is 36 times greater than its 1947 production, which amounted to only 5 percent of the world's output.

Iraq, with the second largest proved reserves in the Middle East, has a reserve ratio to production of 149 to 1. Its reserve of 5,000,000,000 barrels was 8 percent of the world total, but it produced only 1 percent of the world's 1947 yield.

Kuwait, where Burghan is the only field, is estimated to have a reserve of 4,500,000,000 barrels, giving it an amazing ratio of reserve to production of 277 to 1.

Reserves of South America are estimated at 9,651,400,000 barrels, or 15 percent of the world reserves. Venezuela, with 8,350,000,000 barrels, accounts for most of the South American reserve. Last year, Venezuela produced 14 percent of the world's production while holding 13 percent of the reserves. The reserves of Venezuela are 19 times larger than its 1947 output.

European reserves are estimated at only 8,288,700,000 barrels, or 13 percent of the world total. Most of these reserves are located in the U. S. S. R. where, based on the best information available, the proved reserves apparently amount to 7,500,000,000 barrels, or 12 percent of the world total.

Outside of the U. S. S. R., European reserves total only 788,700,000 barrels, or 1.28 percent of the world total.

World Proved Crude Oil Reserves

(THOUSANDS OF BARRELS)

CONTINENT AND COUNTRY	Estimated Proved Reserves Dec. 31, 1947	Percent of Total World Reserves	Crude Oil Production in 1947	Production in 1947 as Percent of World Total	Ratio of Reserves to Annual Production
NORTH AMERICA:					
Canada	200,000	0.32	7,722	0.26	25.9:1
Cuba	3,000	0.01	280	0.01	10.7:1
Mexico	1,058,000	1.71	55,917	1.86	18.9:1
United States	21,487,685*	34.84	1,856,107	61.78	11.6:1
Total North America	22,748,685*	36.88	1,920,026	63.91	11.8:1
SOUTH AMERICA:					
Argentina	275,000	0.45	21,846	0.73	12.6:1
Bolivia	50,000	0.08	375	0.01	133.3:1
Brazil	1,000	0.00	97		10.3:1
Chile	400	0.00			
Colombia	500,000	0.81	25,882	0.86	19.3:1
Ecuador	25,000	0.04	2,282	0.08	11.0:1
Peru	150,000	0.24	12,764	0.43	11.8:1
Trinidad	300,000	0.49	20,521	0.68	14.6:1
Venezuela	8,350,000	13.54	434,885	14.47	19.2:1
Total South America	9,651,400	15.65	518,652	17.26	18.6:1
EUROPE:					
Albania	25,000	0.04	365	0.01	68.5:1
Austria	70,000	0.11	6,684	0.22	10.5:1
Czechoslovakia	3,000	0.01	245	0.01	12.2:1
England	7,200	0.01	351	0.01	20.5:1
France	10,000	0.02	206	0.01	48.5:1
Germany	80,000	0.13	4,029	0.13	19.9:1
Hungary	72,000	0.12	4,330	0.15	16.6:1
Italy	1,000	0.00	80		12.5:1
Netherlands	25,000	0.04	1,478	0.05	16.9:1
Poland	20,000	0.03	944	0.03	21.2:1
Roumania	475,000	0.77	28,773	0.96	16.5:1
U.S.S.R.	7,500,000	12.16	172,000	5.73	43.6:1
Yugoslavia	500	0.00	365	0.01	1.4:1
Total Europe	8,288,700	13.44	219,850	7.32	37.7:1

CONTINENT AND COUNTRY	Estimated Proved Reserves Dec. 31, 1947	Percent of Total World Reserves	Crude Oil Production in 1947	Production in 1947 as Percent of World Total	Ratio of Reserves to Annual Production
AFRICA:					
Algeria	100	0.00			
Egypt	141,000	0.23	9,310	0.31	15.1:1
Morocco	400	0.00	22		18.2:1
Total Africa	141,500	0.23	9,332	0.31	15.2:1
†ASIA (Middle East):					
Bahrein	280,000	0.45	9,411	0.31	29.8:1
Iran (Persia)	5,625,000	9.12	154,861	5.16	36.3:1
Iraq	5,000,000	8.11	33,478	1.11	149.4:1
Kuwait	4,500,000	7.30	16,227	0.54	277.3:1
Qatar	500,000	0.81			
Saudi Arabia	3,600,000	5.83	89,852	2.99	40.1:1
†Total Middle East	19,505,000	31.62	303,829	10.11	64.2:1
ASIA (Far East):					
Borneo, British—(Sarawak & Brunei)	200,000	0.32	13,171	0.44	15.2:1
Burma	125,000	0.20	810	0.03	154.3:1
China	15,000	0.02	377	0.01	39.8:1
Formosa (Taiwan)	50	0.00	18		2.8:1
India	35,000	0.06	2,190	0.07	16.0:1
Japan	32,500	0.05	1,310	0.04	24.8:1
Netherlands Indies	850,000	1.38	8,058	0.27	105.5:1
Sakhalin (U.S.S.R.)	90,000	0.15	6,800	0.23	13.2:1
Total Far East	1,347,550	2.18	32,734	1.09	41.2:1
All Asia	20,852,550	33.80	336,563	11.20	62.0:1
AUSTRALIA-NEW ZEALAND	50	0.00	1		50.0:1
World, Undistributed	150	0.00			
TOTAL WORLD	*61,683,035†	100.00	3,004,424	100.00	20.5:1

* United States reserves indicate crude oil only; reserves of approximately 3¼ billion barrels of condensate and other natural gas liquids not included.

† Reserves shown for Middle East countries include only proved reserves; data are exclusive of indicated but not proved reserves (indicated by fields discovered but not yet fully explored); those excluded indicated reserves are estimated as follows: Iran 1 billion barrels, Iraq 1 billion, Kuwait 4½ to 5½ billion, Qatar ½ billion, Saudi Arabia 2 to 2½ billion, total Middle East 9 to 10½ billion barrels.

Produced to Sterling's unusually high standard of quality, these "Soft Steel" A.P.I. Ring gaskets are precision made and micromatically inspected for assurance of true radius and close tolerance on pitch diameter. They are laboratory checked to maintain the softness in metals as required in A.P.I. ring gaskets.

All Sterling "Soft Steel" rings are cadmium plated as added protection against corrosion. Individual handling safeguards their sealing surfaces against damage. Sterling "Soft Steel" A.P.I. Ring Gaskets are immediately available in most popular sizes and pressures.

Specify Sterling on your next order of ring gaskets, from your supply store.

. . . And Now The Stamp of Quality on

A. P. I. RING GASKETS

Sterling
MEANS QUALITY

STERLING PACKING & GASKET CO.

(Incorporated)

Houston, Texas

WORLD REFINING

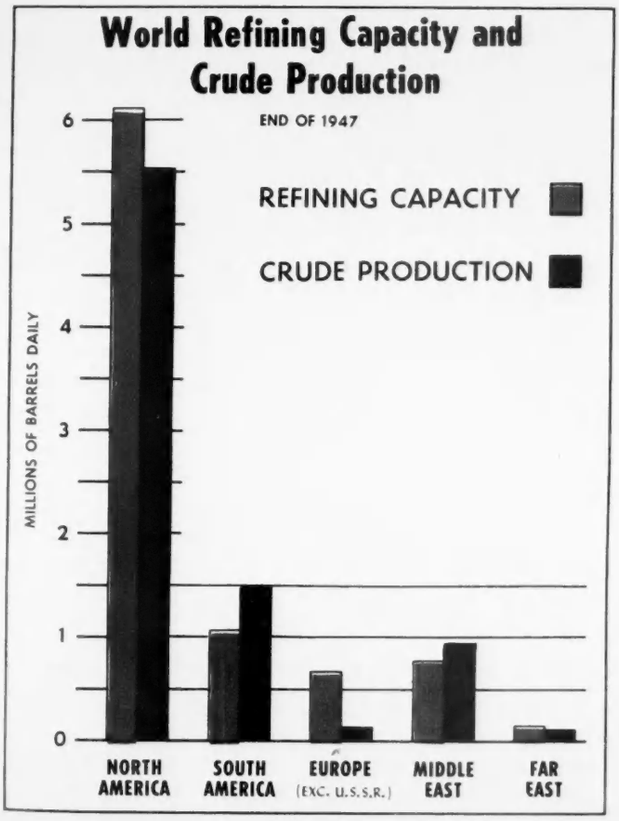
WORLD crude oil refining facilities totaled 9,334,602 barrels per day capacity from 762 plants at the end of 1947. This figure reflects the need for construction of additional refining plants. The capacity for refining was only 7 percent larger than the 8,716,136 barrels of crude oil being produced daily at the end of the year, indicating that all plants would have to operate at 93 percent of capacity to process this volume of crude. This does not provide a sufficient margin for plant shutdowns certain to be required for repairs, maintenance and clean out work. The need for expansion of refining capacities is further magnified by the necessity of providing facilities capable of handling the enlarged quantities of crude oil which must be produced to bring supply into balance with rapidly rising consumption.

North America had two thirds of the world's refining capacity: 453 plants with a capacity of 6,111,705 barrels. Continual expansion during 1948 in the U. S. is expected. Canada and Mexico have ambitious refinery construction programs.

South America's 55 plants had a refinery capacity at the end of 1947 totaling 1,053,690 barrels daily, in contrast to a daily production of 1,484,107 barrels. Much crude is shipped to the United States and Europe for refining. Venezuela is both constructing and planning further additions to refineries. Bolivia, Chile and Brazil are planning new refineries.

In Europe, outside of Russia where accurate information is not available, 141 plants, many slowly achieving rehabilitation after serious war damages and despite shortages, had a daily capacity of 674,194 barrels, compared with a daily crude production of only 132,095 barrels. Refinery expansion is a major phase of Great Britain's oil program, and France continues to rehabilitate its refineries steadily. Construction is planned for Italy, The Netherlands, and Sweden.

The 9 refineries of the Middle East had a capacity of 795,500 barrels, the area producing 958,402 barrels of crude daily.



Far East refineries, some of which were still damaged and inaccessible, generally made good progress in rehabilitation during 1947. The 31 refineries in the area achieved a daily capacity of 142,883 barrels. Daily production was 118,850 barrels.

World Refining Facilities
(End of 1947)

CONTINENT and Country	Number of Plants	Daily Refining Capacity (Barrels)	Daily Crude Oil Production (Barrels)
NORTH AMERICA:			
Canada	39	263,225	24,994
Cuba	3	4,900	767
Mexico	10	172,580	153,372
United States	401	5,671,000	5,336,900
Total North America	453	6,111,705	5,516,033
SOUTH AMERICA:			
Argentina	18	100,745	60,523
Aruba	2	395,000	.....
Bolivia	2	2,500	1,119
Brazil	5	2,545	335
Chile	3	400	.....
Colombia	2	17,700	75,387
Curacao	1	275,000	.....
Ecuador	2	3,300	6,358
Peru	4	31,300	35,921
Trinidad	5	93,300	56,931
Uruguay	1	8,000	.....
Venezuela	10	123,900	1,247,533
Total South America	55	1,053,690	1,484,107
EUROPE:			
Albania	1	750	1,000
Austria	8	28,200	18,311
Belgium	5	7,534	.....
Bulgaria	3	2,100	.....
Czechoslovakia	5	3,690	670
Denmark	1	400	.....
France	14	110,400	576
Germany	23	32,550	11,466
Great Britain	22	141,650	900
Hungary	7	11,779	10,498
Italy	8	33,400	220
Netherlands	1	23,500	6,098
Norway	1	1,000	.....
Poland	5	73,000	2,801
Portugal	1	4,600	.....
Roumania	24	157,850	78,555
Spain, inc. Canary Islands	2	12,700	.....
Sweden	2	8,000	.....
Switzerland	1	1,500	.....
Trieste	2	11,500	.....
Yugoslavia	5	8,100	1,000
Total Europe	141	674,194	132,095
U.S.S.R.: Includes former Polish area and Asiatic Russia	63	500,000[1]	471,233[1]
AFRICA:			
Algeria	2	130	2
Egypt	2	36,800	35,260
Morocco	1	200	151
Total Africa	5	37,130	35,413
ASIA: Middle East:			
Bahrein Island	1	153,500	28,000
Iran	2	422,100	472,000
Iraq	3	9,900	91,402
Kuwait	.....	.....	62,000
Lebanon	1	5,000	.....
Palestine	1	90,000	.....
Saudi Arabia	1	115,000	305,000
Total Middle East	9	795,500	958,402
ASIA: Far East:			
Borneo	1	8,500	10,613
Brunei	.....	.....	49,500
Burma	1	550	548
China, inc. Formosa	2	7,000	1,034
India	1	6,300	5,097
Japan	17	31,033	3,500
Java	2	2,000	1,150
Korea	1	n. a.	.....
Pakistan	2	6,500	915
Sarawak	1	30,000	800
Sumatra	2	51,000	45,693
Thailand (Siam)	1	n. a.	.....
Total Far East	31	142,883	118,850
OCEANIA:			
Australia	5	19,500	3
TOTAL WORLD	762	9,334,602	8,716,136

[1] Estimated.

AMERICAN IRON *4 Point* PROTECTION!

STABILIZER SEAL

Plus **THREAD SEAL**

Plus **INSIDE SEAL**

Plus **SHOULDER SEAL**

YOU GET ALL 4 IN AMERICAN IRON'S

Straight Grip TOOL JOINTS

HERE'S REAL PROTECTION against joint leakage in your drilling string! AMERICAN IRON'S advanced, simplified design for these *Straight Grip* Tool Joints provides an INSIDE SEAL . . . giving you FOUR sealing areas! Furthermore, this simplified design *so controls the reduction of area* that the SEAL BECOMES TIGHTER as high tension loads and pump pressure INCREASE!

Designed right . . . made right . . . and installed right . . . these *Straight Grip* Tool Joints lead the field for simplicity of design—and efficiency of performance. AMERICAN IRON'S simplified method of field installation and removal of these joints is as advanced as *Straight Grip* Tool Joints themselves. It's faster . . . EASIER! Try it and see for yourself!

AMERICAN IRON & MACHINE WORKS CO.

Oklahoma City, Oklahoma — Box 1177 — Phone L. D. 518 — District Office, Houston, Texas

Export Office: 420 Lexington Ave., New York City, N. Y.

Also manufacturers of A. P. I. and "Amweld" (counterbore weld) Tool Joints

WORLD COMPLETIONS and FOOTAGE

DRILLING throughout the world has reflected the sharply increasing demand for petroleum during 1947. With some increases in availability of materials, it has been possible to step up the volume of drilling, and the trend must continue if production is kept at necessary levels.

Completions throughout the world totaled 36,502 in 1947, representing a gain of 10½ percent over the total for 1946, and as usual the major portion was in the United States, with 33,646 wells, or 92 percent of the world total.

While the number of wells increased by 10½ percent, the footage drilled increased by 12½ percent, indicating that operators are going after deeper production, and also serving to reflect the increased volume of exploratory drilling. Total footage drilled during the year was 123,198,157 feet, based on available data, and the 5557 rigs running at the end of the year as compared with 4893 the preceding year make it possible to attain a still greater volume if materials are forthcoming.

Activity outside the United States has become much more general during 1947, and the 2856 wells drilled in foreign countries (excluding Russia) represent a gain of 30 percent over 1946. Most of the gain was registered in two areas—Canada and Venezuela, which together accounted for the completion of 1472 wells, or slightly more than 50 percent of all of the wells drilled in the world outside the United States and Russia.

Canada, with drilling booms in progress at the Leduc and Lloydminster in Alberta and Saskatchewan, drilled 685 wells during 1947, compared with 586 in 1946. Both areas will require much drilling to complete development, and new discoveries during the year in Alberta may support a continuation of the stepped-up program.

Elsewhere in North America, Mexico is still plagued by shortages of materials plus the more acute shortage of areas in which to drill, and its volume remained almost static during the year with 50 wells completed in 1947 as against 49 drilled in 1946.

Venezuela continues as the country receiving the most development of any nation outside the United States, and it is more than likely that this will continue through 1948 if sufficient materials, particularly tubular goods, are available. The 787 wells completed in Venezuela during the year represented a gain of 160 wells over the total for 1946, and the increasingly large number of heavy rigs being used in the country presage more footage per well for the future. In completing 787 wells, operators drilled a total of 4,161,081 feet of hole which represents 41½ percent of all the footage drilled outside the United States.

The Caribbean area, Venezuela, Colombia and Trinidad, accounted for 38.2 percent of all the wells drilled outside the United States, and for 50.5 percent of all the footage drilled.

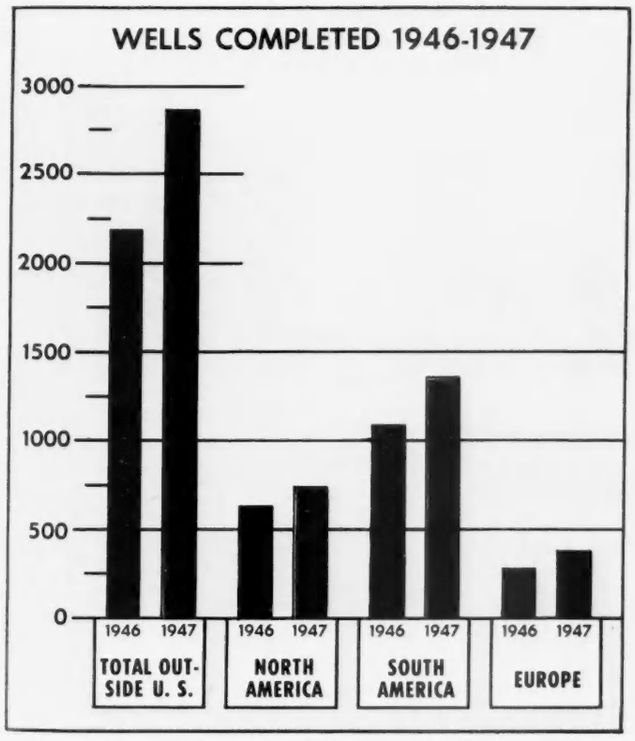
In the Middle East, where comparatively few wells are necessary to keep up the enormous producing potential, some drilling was done in each country, but the most was in Saudi Arabia where 24 wells were completed in comparatively new fields are in process of definition and where potential is being built up in anticipation of increased transportation.

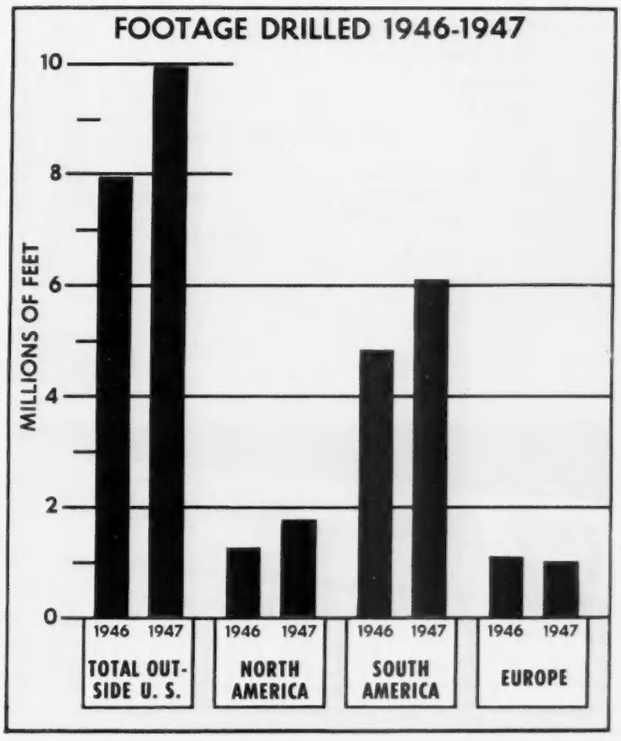
Kuwait, after completing rehabilitation of wells plugged during the war, has started an active campaign with 5 rigs actually drilling new wells at the end of the year, and expected to step this up to 12 during 1948.

Iraq Petroleum Company and its subsidiaries, in addition to drilling 8 wells in Iraq has wildcat rigs operating in Lebanon, Palestine, Syria and Iraq and has started operations again on Qatar with one rig.

A most encouraging factor was the activity in the Far East, particularly the East Indies, where 91 rigs completed 134 wells.

Drilling Activity Outside of United States





Baash-Ross News

BAASH-ROSS TOOL COMPANY • LOS ANGELES • HOUSTON • OKLAHOMA CITY • NEW YORK

OUR 28th YEAR

Now available in TWO TYPES...

The BAASH-ROSS POWER SWIVEL

Constant speed — Constant torque
Variable speed — Variable torque

Complete...

No Rotary Table or Auxiliary Equipment Necessary!

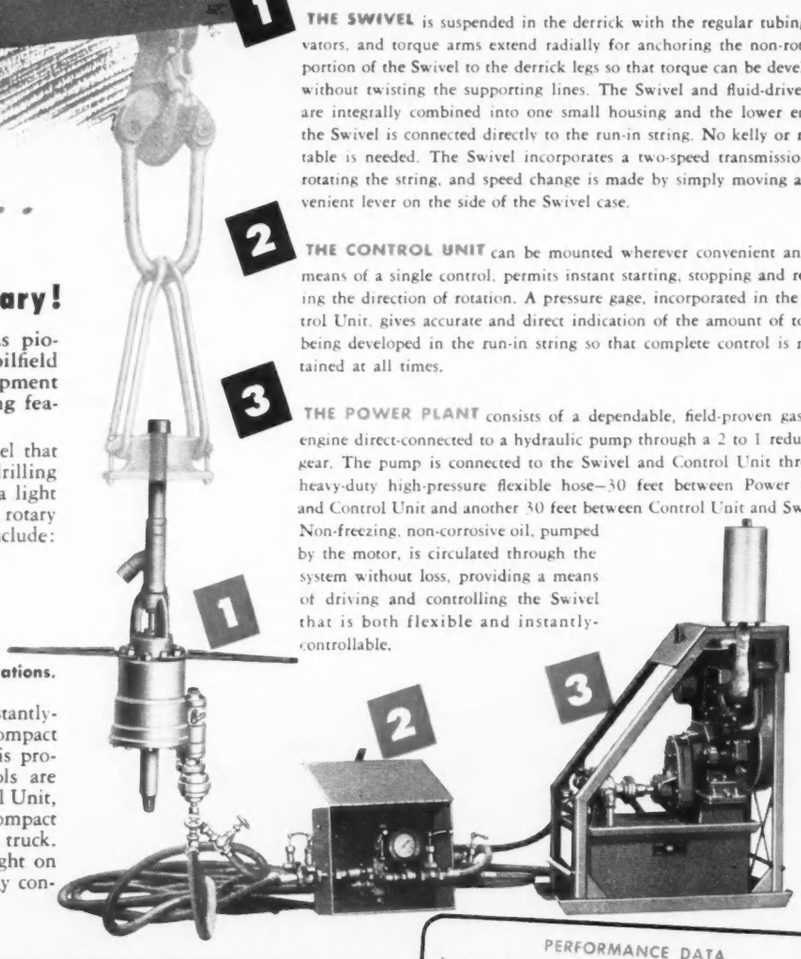
From the same organization that has pioneered so many important advancements in oilfield equipment, comes another *really new* development that has many unique money and time-saving features. It is the Baash-Ross Power Swivel.

This unit consists of a fluid-driven Swivel that can be suspended in the rig—*any* rig, whether drilling or producing—to provide a means of rotating a light string of tools without need for installing kelly, rotary table or other heavy equipment. Applications include:

- **Internal cutting and fishing jobs**
- **Drilling out bridges**
- **Scraping liners**
- **Drilling out cement in tubing**

. . . and other similar operations.

The Swivel is driven by positive, instantly-controlled hydraulic pressure generated by a compact Power Unit, and continuous finger-tip control is provided by a Control Unit in which all controls are centralized. The entire assembly—Swivel, Control Unit, Power Plant and connecting equipment—is so compact it can be readily transported in a small pick-up truck. And if desired, the Power Plant can be left right on the truck for quick jobs—or can be set off at any convenient place on or near the rig.



1 **THE SWIVEL** is suspended in the derrick with the regular tubing elevators, and torque arms extend radially for anchoring the non-rotating portion of the Swivel to the derrick legs so that torque can be developed without twisting the supporting lines. The Swivel and fluid-drive unit are integrally combined into one small housing and the lower end of the Swivel is connected directly to the run-in string. No kelly or rotary table is needed. The Swivel incorporates a two-speed transmission for rotating the string, and speed change is made by simply moving a convenient lever on the side of the Swivel case.

2 **THE CONTROL UNIT** can be mounted wherever convenient and, by means of a single control, permits instant starting, stopping and reversing the direction of rotation. A pressure gage, incorporated in the Control Unit, gives accurate and direct indication of the amount of torque being developed in the run-in string so that complete control is maintained at all times.

3 **THE POWER PLANT** consists of a dependable, field-proven gasoline engine direct-connected to a hydraulic pump through a 2 to 1 reduction gear. The pump is connected to the Swivel and Control Unit through heavy-duty high-pressure flexible hose—30 feet between Power Plant and Control Unit and another 30 feet between Control Unit and Swivel. Non-freezing, non-corrosive oil, pumped by the motor, is circulated through the system without loss, providing a means of driving and controlling the Swivel that is both flexible and instantly-controllable.

TWO TYPES...MANY APPLICATIONS

To meet the various requirements of different operators, the Baash-Ross Power Swivel is available in two types . . .

1. **MODEL "F" which provides a choice of two rotating speeds as indicated at right, and in each speed both the torque and RPM remain practically constant at all times.**
2. **MODEL "FV" which provides two speed ranges, and in each range both the torque and RPM are variable between wide limits as indicated at right.**

Since the Power Swivel requires no drawworks or other heavy equipment that is complicated and costly to install, it is ideal for many light rotating jobs—for drilling out cement plugs and sand bridges, for scraping paraffine, for rotating internal cutters, etc.

On cutting jobs its smooth, sensitive, easily-controlled hydraulic drive is far superior to the irregularities and uneven feed of manual rotation. It is also safer because there is no need for workmen to be near the stretched pipe while it is being cut . . . nor for them to work on makeshift platforms. The Power Swivel can be operated at any height in the rig, eliminating need for cutting off the run-in string at floor level.

PERFORMANCE DATA

Swivel Capacity—80,000 lbs. Tensile Loading.

Speed Model "F", 17 RPM—constant—low speed
34 RPM—constant—high speed
Model "FV", 1 to 17 RPM—variable—low speed.
1 to 34 RPM—variable—high speed.

Torque Maximum—both models . . . 15,000 inch-lbs.
Elevator Neck—2⅞" O.D.
Lower Stem Joint—2⅜" API Regular Pin.
Goose Neck—2" API Line Pipe (female thread).

Power Unit 4 cycle gasoline engine, 9.2 h.p. at 2200 RPM, geared 2 to 1 reduction.
Magneto, spark plugs and wiring all spark-proof—exhaust protected with spark arrestor.
Pump equipped with safety valve for 1000 p.s.i. maximum pressure.
Sump Capacity—20 U. S. gallons.

Write for full details
—or see your Baash-Ross Representative

WORLD COMPLETIONS and FOOTAGE—Continued

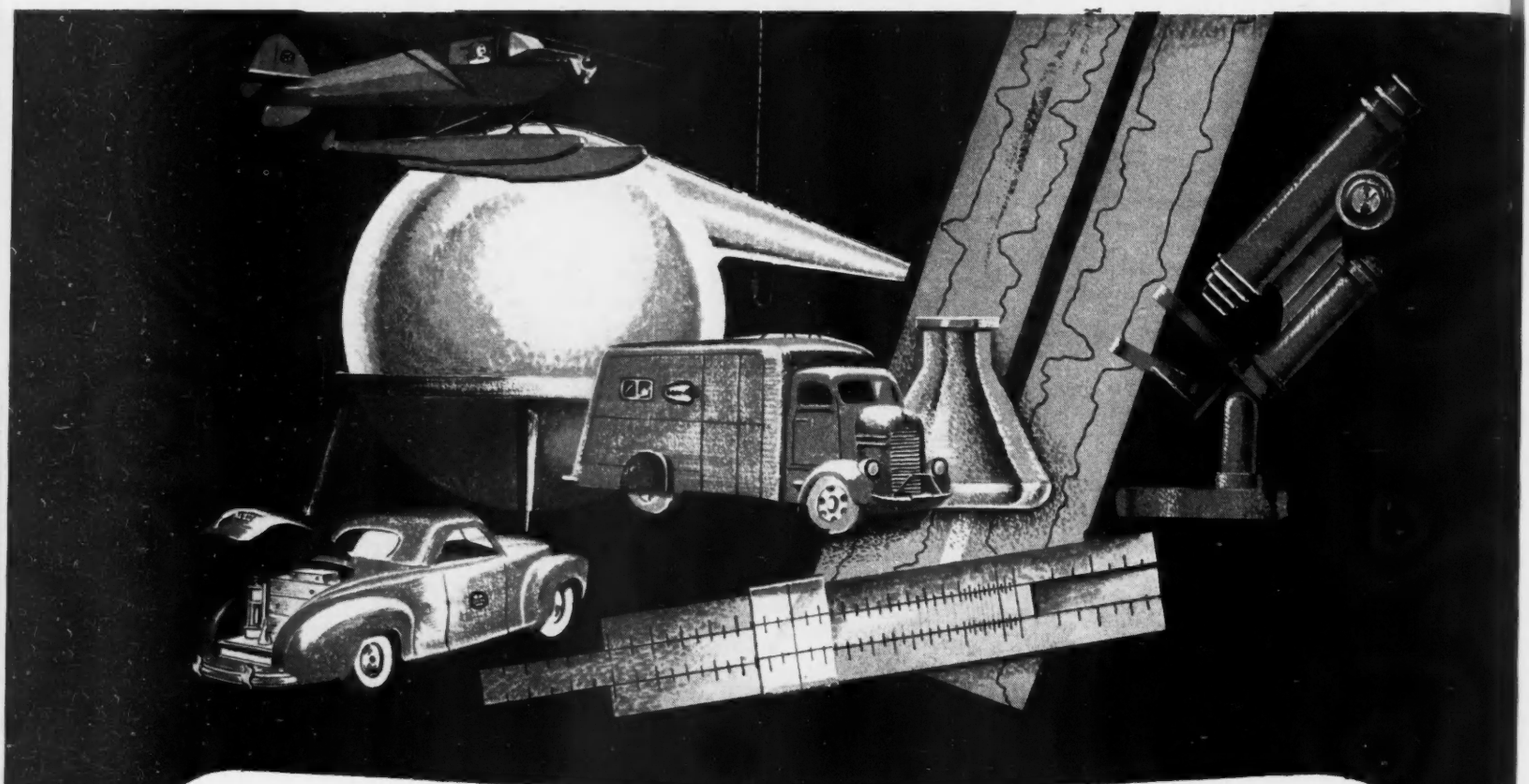
Drilling Activity By Countries in 1946 and 1947

COUNTRY	Total Wells Completed in 1946	Footage Drilled in 1946 Completions	Wells Drilling End of 1946	WELLS COMPLETED IN 1947					Wells Drilling or Shut Down End of 1947
				Oil	Gas	Dry	Total Wells	Total Footage	
North America Except United States:									
Alaska	1	8,768	1	.....	.....	1	1	6,212	1
Canada	586	983,262	n.a.	224	230	231	685	1,496,229	38[4]
Mexico	49	261,253	11	23	2	25	50	286,723	25
Total North American Except United States	636	1,253,283	12	247	232	257	736	1,789,164	64
West Indies:									
Bahama Islands	.....	.....	.....	.....	.....	1	1	14,587	.....
Cuba	n.a.	n.a.	n.a.	.....	.....	3	3	16,032	n.a.
Dominican Republic	1	8,769	.....	.....	.....	1	1	5,682	.....
Haiti	.....	.....	.....	.....	.....	2	2	12,163	.....
Trinidad	120	531,458	3	137	.....	5	142	281,228	24
Total West Indies	121	540,227	3	137	.....	12	149	329,692	24
Central America:									
Nicaragua	.....	.....	.....	.....	.....	.....	.....	.....	1
Panama	.....	.....	.....	.....	.....	.....	.....	.....	1
South America:									
Argentina	195	620,344	n.a.	182	5	21	208	774,396	49
Bolivia	3	5,126	11	6	.....	.....	6	15,844	14
Brazil	4	12,647	n.a.	21	1	4	26	71,519	5
Chile	2	18,001	1	4	2	.....	6	44,905	2
Colombia	118	454,744	22	133	1	28	162	600,339	30
Ecuador	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	10
Paraguay	.....	.....	.....	.....	.....	1	1	13,579	1
Peru	134	322,715	50	115	.....	41	156	450,743	36
Venezuela	627	3,379,811	83	689	9	89	787	4,161,081	134
Total South America	1,083	4,813,388	167	1,150	18	184	1,352	6,132,407	281
Europe:									
Albania	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Austria	n.a.	n.a.	n.a.	5	.....	.....	5	n.a.	1
Czechoslovakia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Denmark	.....	.....	.....	.....	.....	1	1	7,528	2
France	53	181,413	37	23	2	29	54	144,540	37
Germany	110	261,337	n.a.	63	1	50	114	290,945	28
Great Britain	11	31,763	1	5	.....	7	12	33,203	12
Hungary	15	78,750	5	11	6	7	24	106,393	11
Italy	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	5
Netherlands	9	48,894	1	15	.....	2	17	56,902	6
Poland	85	101,514	n.a.	n.a.	n.a.	n.a.	82	101,016	n.a.
Portugal	.....	.....	.....	.....	.....	.....	.....	.....	.....
Roumania	n.a.	438,505	n.a.	59	3	2	64	275,832	40
Spain	.....	.....	.....	.....	.....	.....	.....	.....	1
Sweden	.....	.....	.....	.....	.....	.....	.....	.....	.....
U.S.S.R. (incl. Sakhalin)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Yugoslavia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total Europe	283	1,142,176	44	181	12	98	373	1,016,359	143
Africa:									
Algeria	4	3,140	n.a.	.....	.....	13	13	14,685	5
Egypt	16	67,441	n.a.	9	.....	6	15	70,370	7
Morocco	19	42,890	3	1	.....	33	34	67,840	6
Total Africa	39	113,471	3	10	.....	52	62	152,895	18
Middle East:									
Bahrein Island	.....	.....	.....	6	.....	.....	6	13,660	1
Iran	6	8,532	3	5	.....	.....	5	32,144	5
Iraq	4	8,286	4	4	.....	.....	8[1]	19,937	3
Kuwait	.....	.....	2	5	.....	.....	5	23,818	5
Lebanon	.....	.....	.....	.....	.....	.....	.....	.....	1
Palestine	.....	.....	.....	.....	.....	.....	.....	.....	1
Qatar	.....	.....	.....	.....	.....	.....	.....	.....	1
Saudi Argia	11	62,635	5	22	.....	2	24	143,224	7
Syria	.....	.....	.....	.....	.....	.....	.....	.....	2
Turkey	.....	.....	1	1	.....	.....	1	4,400	4
Total Middle East	21	79,453	15	43	.....	2	49	237,213	30
Far East:									
British East Indies (Brunei & Sarawak)	n.a.	n.a.	n.a.	22	.....	.....	22	91,799	42
Burma	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2
China (Incl. Formosa)	4	n.a.	n.a.	6	.....	.....	6	n.a.	3
India and Pakistan	4	31,800	3	n.a.	n.a.	n.a.	n.a.	n.a.	12
Japan	n.a.	n.a.	n.a.	23	5	31	59	144,030	24
Netherlands East Indies	n.a.	n.a.	n.a.	43	2	1	46	75,182	7
Philippines	.....	.....	.....	.....	.....	1	1	9,950	1
Total Far East	8	31,800	3	94	7	33	134	320,961	91
Oceania:									
Australia	n.a.	n.a.	1	.....	.....	1	1	7,300	2
New Zealand	.....	.....	.....	.....	.....	.....	.....	.....	.....
Papua	.....	n.a.	1	.....	.....	.....	.....	.....	1
Total Oceania	.....	.....	2	.....	.....	1	1	7,300	3
Total Outside United States[2]	2,191	7,973,798	249	1,862	269	639	2,856	9,985,991	655
United States[3]	30,845	101,492,958	4,644	17,478	3,809	9,546	33,646	113,212,166	4,901
World Total	33,036	109,466,756	4,893	19,340	4,078	10,185	36,502	123,198,157	5,557

[1] Includes 4 observation wells. [2] Based on available data. [3] United States' total includes input wells, disposal wells, and old wells drilled deeper, which totaled 2,700 in 1946 and 2,813 in 1947. [4] Western Canada only. n.a. Indicates data not available.

BAROID

DEVELOPED FOR FASTER, SAFER, MORE



MUD TESTING EQUIPMENT Baroid offers a complete line of tested and quality built mud testing equipment to assist the well engineer or operator in scientific mud control and accurate analysis. All apparatus conform to A.P.I. standards wherever such standards exist.

WELL LOGGING SERVICE The Baroid Well Logging Service presents a unique and relatively fool-proof method of determining the presence or absence of oil or gas in the various formations encountered while drilling.

SPECIALTY EQUIPMENT Baroid offers a line of high-quality oil field specialties which now include: V-Belt Shock Absorbers, Replaceable Insert and One-piece Type Drill Pipe Wipers, Autotrol Units and Pulsation Dampeners that meet a wide range of requirements in the drilling industry.

FIELD LABORATORIES Acutely conscious of time changes in mud and core sample analysis, Baroid Technicians are now equipped with Mobile Laboratories, containing complete mud analysis equipment for on-the-job testing. This new method results in improved service with faster, more valuable data.

FIELD ENGINEERING SERVICE To render more efficient service to operators, Baroid maintains trained Field Service Engineers in or near all active oil fields in the United States. Each engineer is provided with a specially equipped car for making mud tests at the well.

LABORATORY CONTROL and DEVELOPMENT Three comprehensive mud laboratories, located at Los Angeles, Tulsa and Houston are maintained by Baroid as a supplement to their field services. Here, skilled technicians are employed in developing new materials, applications and processes for the benefit of well operators.

USED WHEREVER THERE IS DRILLING

WORLD PRODUCING WELLS

AT THE close of 1947 there were 458,126 producing wells in the world's oil fields based on the best information available, and excluding the fields of the U.S.S.R. On this basis it represents a gain of 10,833 wells over the year 1946. The nations outside of the United States showed a greater gain in number of wells than did the United States itself, but although the producing wells in foreign countries actually increased during the year, a part of the total is accounted for by nations for which figures were not available in 1946.

The greater number of producing wells are within the borders of the United States, where 428,522 wells represent 93.5 percent of all the producing wells in the world. At the beginning of 1947 there were 424,302 producing in the U. S., the increase during the year amounting to 4236 wells, while the total of 29,604 in the rest of the world at the end of 1947 represented a gain of 5597 wells during the year.

Most of the wells in the U. S. are produced by artificial lift, with only 49,399 or 11½ percent of the wells flowing naturally, and 379,123 wells produced by pumping, gas lift or other means. At the close of the year the fields of the United States were producing 5,274,100 barrels daily, or an average of 12.3 barrels per day per well which compares favorably with the 11.1 barrels per well being produced each day at the end of 1946, considering an increase in reserve.

Outside the United States, only 4315 of the 29,604 wells are flowing naturally and the overall average is 114.8 barrels daily per well, compared with an average of 98.9 barrels at the close of 1946.

The major portion of the increased per-well output is accounted for by a step-up in production from the Middle Eastern nations, where a total of 958,402 barrels daily is being produced from only 211 wells, or 4542 barrels daily for each well. Increased outlet has allowed an increase at Kuwait which had 13 wells steadily on production at the end of the year. The greatest single increase in the region was in Saudi Arabia which had 53 producing wells making an average of 5754 barrels per well at the end of the year to compare with 32 wells and an average of 5236 barrels a year ago. However, in almost all these areas, the actual number of producing wells is comparatively unimportant, since the fields of Iraq, Iran, Saudi Arabia and Kuwait could step up production tremendously without the drilling of additional wells.

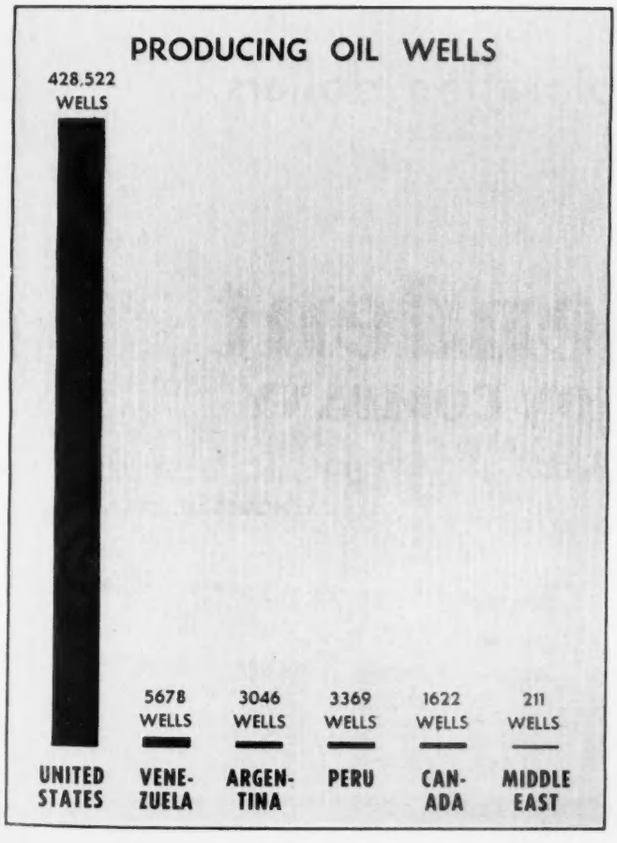
The East Indies made great strides during 1947, particularly in Sarawak and Brunei, where there are now 197 producing wells, of which 57 are flowing, producing an average of 255.3 barrels daily, already nearly double the pre-war output from these areas. The remainder of the East Indies have reported 770 producing wells averaging 77.9 barrels daily per well at the end of the year. Production and the number of wells producing in 1946 was almost negligible.

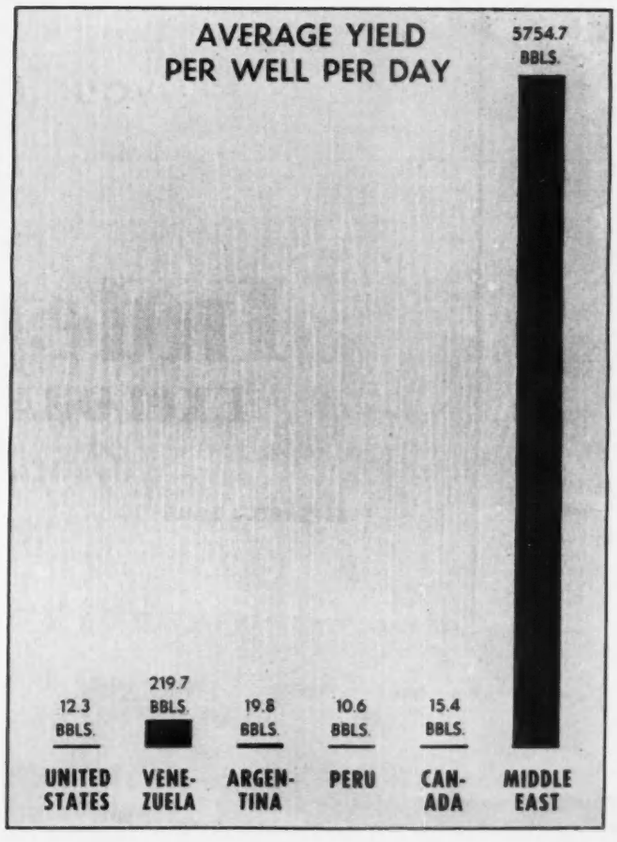
Little change has been noted in India, Pakistan and Burma where communal troubles, or the amount of rehabilitation necessary has not made much progress possible during 1947.

Of the South American countries, Venezuela continues as leader in the average output from its wells, number of producing wells and total production. Its 5678 wells produced a daily average of 1,247,533 barrels at the close of the year, or 219.7 barrels per well, and drilling volume was such that there should be a substatnial increase in the number of producing wells during 1948.

Argentina's producing wells dropped from 3922 in 1946 to 3046 at the end of 1947, relinquishing second place among South American countries to Peru, which had 3369 producers at the close of the year. However, Argentina's wells were pro-

Producing Oil Wells and Daily Output of Principal Areas End of 1947





YOU WILL FIND MORE OIL

with Independent Exploration crews

. . . 17 party chiefs

average over 14 years

of Seismograph field

experience, gives you

greater value for

your exploration dollars.

Independent

EXPLORATION COMPANY

Geophysical Surveys

ESPERSON BUILDING — HOUSTON, TEXAS

Laboratories
and Shop
1922 W. Gray St.

WORLD PRODUCING WELLS—Continued

ducing a daily average of 19.8 barrels each while those in Peru were producing only 10.6 barrels daily.

Colombia, while second in South America production, is in fourth place in number of producing wells, having 987 wells producing an average of 76.3 barrels daily per well, and setting a new all-time production record for the nation.

Ecuador has 718 producing wells which are making only 8.8 barrels each per day, while Brazil, with 60 wells, and Bolivia with 25 producers round out the South American nations actually on production.

Canada's producing picture had brightened considerably by the end of 1947 despite a decline in the number of producing wells at the end of the year, when 1622 producers were being operated. Per-well daily average had risen from 9.4 barrels in 1946 to 15.4 barrels in 1947, largely due to the discovery of flush production in Alberta during the year. Drilling activity, now at a high rate, should see an increase in 1948.

In Mexico, there were only 977 producing wells at the end of the year as compared with 1041 wells at the end of 1946, but the wells were producing at a rate of 156.9 barrels each, or nearly 15 barrels per well more than in 1946.

The Netherlands now has 31 producing wells yielding a daily average of 196.7 barrels per well.

Producing Oil Wells and Daily Production at End of Year, 1946 and 1947, by Countries

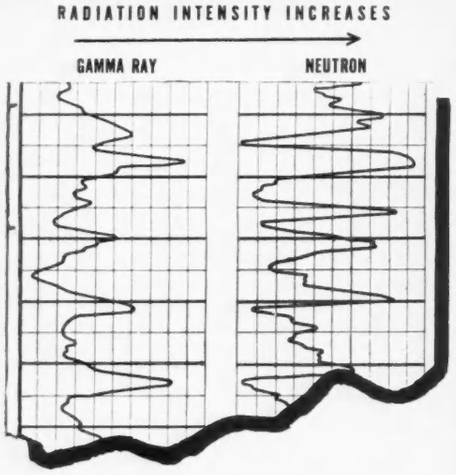
COUNTRY	Total Producing Oil Wells End of 1946	Daily Average Production End of 1946	PRODUCING OIL WELLS AND THEIR OUTPUT AT END OF 1947				
			Flowing	Artificial Lift	Total Producing	Daily Average Production	Barrels Daily Per Well
NORTH AMERICA Except United States:							
Canada	1,929	20,726	.....	.....	1,622	24,994	15.4
Mexico	1,041	135,000	.....	.....	977	153,372	156.9
Total North America Outside United States	2,970	155,726	.....	.....	2,599	178,366	.....
WEST INDIES:							
Cuba	n.a.	n.a.	n.a.	n.a.	n.a.	767	n.a.
Trinidad	1,674	55,383	626	1,308	1,934	56,931	29.4
Total West Indies	1,674	55,383	626	1,308	1,934	57,698	.....
SOUTH AMERICA:							
Argentina	3,922	56,448	70	2,976	3,046	60,523	19.8
Bolivia	22	945	25	.....	25	1,119	44.7
Brazil	8	185	18	42	60	335	5.5
Chile	1	Shut In	.....	.....	.....	Shut In	.....
Colombia	1,050	68,693	51	936	987	75,387	76.3
Ecuador	669	6,467	65	653	718	6,358	8.8
Peru	2,889	34,127	248	3,121	3,369	35,921	10.6
Venezuela	4,699	1,086,704	2,414	3,264	5,678	1,247,533	219.7
Total South America	13,260	1,253,569	2,891	10,992	13,883	1,427,176	.....
EUROPE:							
Albania	n.a.	n.a.	n.a.	n.a.	n.a.	1,000	n.a.
Austria	n.a.	n.a.	n.a.	n.a.	546	18,311	33.5
Czechoslovakia	n.a.	n.a.	n.a.	n.a.	n.a.	670	n.a.
France	616	640	9	696	705	576	0.8
Germany	n.a.	n.a.	91	1,527	1,618	11,466	7.1
Great Britain	233	1,047	2	242	244	900	3.6
Hungary	237	14,100	98	70	168	10,498	62.4
Italy	n.a.	n.a.	n.a.	n.a.	n.a.	220	n.a.
Netherlands	20	2,350	1	30	31	6,098	196.7
Poland	1,125	2,468	7	2,404	2,411	2,801	1.1
Roumania	n.a.	n.a.	n.a.	n.a.	n.a.	78,555	n.a.
U.S.S.R., Including Sakhalin	n.a.	n.a.	n.a.	n.a.	n.a.	489,863	n.a.
Yugoslavia	n.a.	n.a.	n.a.	n.a.	n.a.	1,000	n.a.
Total Europe	2,231	20,605	208	4,969	5,723	621,958	.....
AFRICA:							
Algeria	8	91	.....	5	5	2	0.4
Egypt	143	23,900	28	120	148	35,260	238.2
Morocco	65	40	1	60	61	151	2.4
	65	40	1	60	61	151	2.4
Total Africa	216	24,031	29	185	214	35,413	.....
MIDDLE EAST:							
Bahrein Island	62	20,000	64	.....	64	28,000	437.5
Iran	59	406,000	71	.....	71	472,000	6,647.8
Iraq	14	90,000	10	.....	10	91,402	9,140.2
Kuwait	.....	27,990	13	.....	13	62,000	4,769.2
Qatar	.....	.....	.....	.....	.....	Shut In	.....
Saudi Arabia	32	214,675	53	.....	53	305,000	5,754.7
Turkey	.....	.....	.....	.....	.....	Shut In	.....
Total Middle East	167	758,665	211	.....	211	958,402	.....
FAR EAST:							
British East Indies (Sarawak and Brunei)	n.a.	n.a.	57	140	197	50,300	255.3
Burma	n.a.	n.a.	n.a.	n.a.	n.a.	548	n.a.
China and Formosa	9	1,400	.....	.....	15	1,034	68.9
India and Pakistan	375	5,750	n.a.	n.a.	n.a.	6,012	n.a.
Japan	n.a.	n.a.	29	4,029	4,058	3,500	0.8
Netherland East Indies	n.a.	n.a.	264	506	770	60,043	77.9
Total Far East	384	7,150	350	4,675	5,040	121,437	.....
OCEANIA:							
Australia	.....	.....	n.a.	.....	n.a.	3	.....
Total Oceania	.....	.....	n.a.	.....	n.a.	3	.....
Total Outside United States[1]	20,902	2,275,129	4,315	22,129	29,604	3,400,453	114.8
UNITED STATES	424,301	4,724,900	49,399	379,123	428,522	5,274,100	12.3
TOTAL WORLD[1]	445,203	7,000,029	53,714	401,252	458,126	8,674,553	18.9

n.a. Indicates data not available. [1] Based on available data.

GUN PERFORATING SERVICE

Guns in sizes from 1¾" up to 9⅝", firing from 1 to 128 shots; six types of bullets in a full range of sizes: these, combined with Lane-Wells' *Selective Firing*, provide gun-perforating service that is "tailored" to fit each individual job—*your* job is done just as *you* want it.

RADIOACTIVITY WELL LOGGING



The Gamma Ray and Neutron Curves and the Collar Log on a Lane-Wells Radioactivity Well Log give you a *complete* picture of your well, even through casing, or in contaminated mud. They locate formations, and tie the formations to accurately located benchmarks. They reveal zones of porosity, locate fluid levels, liner tops and gas/oil contacts, and register depth measurements accurately.

ANOTHER GOOD JO

A familiar sight in every oil field—the big brown and silver Lane-W Service Trucks—accepted by tens of thousands of oil well operator the visible assurance of a job done right. Lane-Wells' years of prac oil field experience is one reason; continuous research to improve tools and methods is another; still another is the skill and trainin all Lane-Wells crews. For these all add together into thousands u thousands of successful jobs—gun perforating, radioactivity well logg supplying and setting packers, drillable bridging plugs and o products—the real reasons why so many operators always "Call LANE-WELLS; you'll get the job done RIGHT!"

LANE-WELLS SERVICES AND PRODU

There are specially-designed Lane-Wells Packers, valve or valveless, hookwall or anchor to fit every down-the-hole job that calls for positive packoff. Their FLO-SEAL Packing Rings seal off differential pressures up to 7000 lbs. p.s.i. at temperatures to 300° F., and can be set and re-set time after time.

PRINCIPAL OIL COMPANIES—Operating Outside United States

COMPANY	Location of Producing Fields or Concessions	OWNERSHIP
—A—		
Abasand Oil, Ltd	Canada	
Alliance Oils	Canada	
American International Fuel and Petroleum Co.	Nicaragua	Gulf Oil Corp.
Anglo-Bahamian Pet. Co., Ltd.	Bahamas	Anglo-Iranian Oil Co.
Anglo-Canadian Oil Co., Ltd.	Canada	
Anglo-Ecuadorian Oilfields, Ltd.	Ecuador	British interests
Anglo-Egyptian Oil Fields, Ltd.	Egypt	Shell Group, Egyptian government
Anglo-Iranian Oil Co., Ltd.	Iran, Iraq, Kuwait, Bahamas (Partly through subsidiaries)	British government 52½%; Burmah Oil Co., Ltd. 25%; individuals 22½%
Antilles Pet. Co.	Trinidad	McColl Frontenac Oil Co.
Apex (Trinidad) Oilfields, Ltd.	Trinidad	British interests
Arabian-American Oil Co.	Saudi Arabia	Standard Oil Co. of Calif. 30%; Standard Oil Co. (New Jersey) 30%; The Texas Co. 30%; Socony-Vacuum Oil Co. 10
Assam Oil Co.	India	Burmah Oil Co.
"Astra" Compañía Argentina de Petróleo (Astra Pet. Co. of Argentina)	Argentina	Argentine interests
Astra Romana	Roumania	Shell Group
Atlantic Refining Co.	Cuba, Venezuela, Haiti	Atlantic Refining Co.
Attock, Oil Co., Ltd.	India	Burmah Oil Co. and other British interests.
Australasian Pet. Co., Pty., Ltd.	New Guinea	Anglo-Iranina Oil Co.; Socony-Vacuum Oil Co.
Australian Commonwealth Government	Australia	Government.
Australian Mining and Smelting Co., Ltd.	Australia	
Australian Oil Development Co.	Australia	Australian interests
Azienda Generale Italiana Petroli	Italy	Standard Oil Co. (New Jersey) and Italian interests.
Azienda Italian Petrolia Albania	Albania	Italian government (Ownership may be determined by United Nations).
—B—		
Bahamas Oil Co., Ltd.	Bahamas	Superior Oil Co. of Calif.
Bahamas Oil Exploration Co., Ltd.	Bahamas	Gulf Oil Corp.
Bahamas Mining Co., Ltd.	Bahamas	F. H. Christie et al.
Basrah Petroleum Co., Ltd.	Iraq	Iraq Pet. Co.
Bata Petroleums, Ltd.	Canada	
Bataafsche Pet. Maatschappij (N. V. de)	Netherlands Indies	Shell Group.
Baxter Lake Oils	Canada	
Beckwith and Co.	Egypt	Standard Oil Co. (New Jersey).
Berry Creek Petroleums, Ltd.	Canada	
Bonaparte Gulf Company, Pty., Ltd.	Australia	Vacuum Oil Co., Pty., Ltd. & Australian and British interests
Braunschweigische Bohrgesellschaft	Germany	German government
British-American Oil Co., Ltd.	Canada	Canadian interests
British-Bahamian Oil Dev. Co., Ltd.	Bahamas	Central Mining and Investment Co.
British Controlled Oilfields, Ltd.	Venezuela, Ecuador	British interests
British Malayan Pet. Co., Ltd.	British Borneo	Shell group
Burbach-Kaliwerke A. G.	Germany	
Burmah Oil Co., Ltd.	Burma, India	Shell group
—C—		
Caldas Pet. Co.	Colombia	The Texas Co.
California Standard Co.	Canada	
Calling Valley Oils	Canada	
Caloil Corporation	Canada	Standard Oil Co. of Calif.
Canadian Gulf Oil Co.	Canada	Gulf Oil Corp.
Cape Breton Pet. Co.	Canada	
Caracas Pet. S. A.	Venezuela	British interests
Caribbean Pet. Co.	Venezuela	Shell group
Carolina Oil Co.	Ecuador	Ecuadorian interests
Central Area Exploration Co.	Venezuela	British interests
Chinese Pet. Corp.	China	Chinese government
Colombian Pet. Co.	Colombia	Socony-Vacuum Oil Co. 50%; Texas Co. 50%.
Colon Development Co., Ltd.	Venezuela	Shell group
Commoil, Ltd.	Canada	
Compagnie Française des Pétroles	Iraq	Controlled by French government
Compañía Colombiana de Petróleo El Condor	Colombia	Shell group
Compañía Colombiana de Petróleo Eldorado S.A. (Colombian Pet. Co.)	Colombia	The Texas Co. 50%; Socony-Vacuum Oil Co. 50%.
Compañía Consolidad de Petróleo (Consolidated Pet. Co.)	Venezuela	Venezuela Pet. Co. or subsidiary of Sinclair Oil Corp
Compañía "El Sosneado" de Petróleo	Argentina	Argentine private interests
Compañía de Petróleo del Cravo	Colombia	Tropical Oil Co.
Compañía de Petróleo Ganso Azul, Ltd. (Ganso Azul Pet. Co.)	Peru	American interests
Compañía de Petróleo Gran Colombia, S. A. (Great Colombia Pet. Co.)	Colombia	The Texas Co. 33⅓%
Compañía de Petróleo La Estrella de Colombia	Colombia	Shell group
Compañía de Petróleos del Pacifico	Colombia	Socony-Vacuum Oil Co.
Compañía de Peten S. A.	Guatemala	Guatemalan and American interests
Compañía de Petróleos Shell de Colombia	Colombia	Shell group
Compañía Petrolera la Estrella de Cuba	Cuba	Shell group
Compañía Petrolera Lobitos (Lobitos Pet Co.)	Peru	British interests
Compañía Petrolera del Zulia	Colombia	Tropical Oil Co.
Compañía Ferrocarrilera de Petróleo (Railroad Pet. Co.)	Argentina	British Railways of Ar-Argentina
Compañía Peruana de Petróleo "El Oriente"	Peru	Peruvian private interests
Compañías Unidas de Petróleo	Colombia	Sinclair, Cities Service and Richfield
Concepción Ecuadorian Oilfields, Ltd.	Ecuador	British interests
Concordia	Roumania	Belgian interests
Condamine Oil Pty., Ltd.	Australia	Australian interests
Conselho Nacional do Petróleo	Brazil	Brazilian government
Continental Oil Co. of Canada	Canada	
Continental Petroleums, Ltd.	Canada	
Corporación de Fomento de la Producción	Chile	Chilean government
Creole Petroleum Corp.	Venezuela	Standard Oil Co. (New Jersey)
—D—		
Daido Oil Company	Japan	Japanese interests
Danish-American Prospecting Co.	Denmark	Gulf Oil Corp.
D'Arcy Exploration Co., Ltd.	England; Australia	Anglo-Iranian Oil Co., Ltd.
Decalta Oils	Canada	
Deilman, C. (formerly DEUTAG)	Germany	German interests
Deutsche Erdöl-Aktiengesellschaft (DEA)	Germany—Austria	
Deutsche Vacuum Oel Aktiengesellschaft	Germany	Socony-Vacuum Oil Co.
Diadema Argentina S.A. de Petróleo (Diadem Pet. of Argentina)	Argentina	Shell group
Dominion Oil Co., Ltd.	Canada	Standard Oil Co. of Calif.
—E—		
Ecuador Oilfields, Ltd.	Ecuador	British Controlled Oilfields, Ltd.
Ecuador Tropical Oil Co.	Ecuador	Ecuadorian interests
Eguchi Oil Association	Japan	Japanese interests
Empresa Petrolera Fiscal	Peru	Peru government
Erdol Produktions Gesellschaft	Austria	German interests
Establecimiento Industrial de Petróleo de Zorritos	Peru	Peruvian government
—F—		
Far East Development Co.	Philippines	American interests
Freney Kimberley Oil Co.	Australia	
Frome-Broken Hill Co., Pty., Ltd.	Australia	Socony-Vacuum; D'Arcy Exploration
—G—		
Gaspe Oil Ventures, Ltd.	Canada	
Gewerkschaft Brenner	Germany	German interests
Gewerkschaft Brigitta	Germany	Shell group; Standard Oil Co. (N. J.)
Gewerkschaft Elwerath	Germany, Austria	German interests
Gewerkschaft Franz	Germany	German interests
Gewerkschaft Norddeutschland	Germany	German interests
Gewerkschaft Vereinigte Borgholzhausen	Germany	German interests
Glencoe Oil Co., Ltd.	Canada	
Globe-Dillon Syndicate	Canada	Globe, Calmont, Princess, Gateway, Phillips, etc.
Grossdeutsche Schachtbau und Tiefbohrgesellschaft	Germany	German interests
Guasare Oil Co.	Venezuela	Drilling and Exploration Co.; Lion Oil Refining Co., et al
Gute Hoffnungshutte	Germany	German interests
—H—		
Hamburger Gasgesellschaft	Germany	German interests
Highwood Development Co.	Canada	
Hokkaido Oil Development Co.	Japan	
Hokuriku Oil Association	Japan	
Home Brazeau Syndicate	Canada	Home; Anglo-Canadian; Imperial; Shell; Socony-Vacuum; Cal. Standard
Home Oil Co., Ltd.	Canada	
Husky Refining Co.	Canada	
—I—		
Imperial Oil Company	Japan	Japanese private interests; Japanese government
Imperial Oil Company, Ltd.	Canada	Standard Oil Co. (N.J.) 70%
Indo-Burma Pet. Co., Ltd.	Burma	British interests
International Ecuadorean Pet. Co.	Ecuador	Imperial Oil Co.
International Pet. Co., Ltd.	Peru, Venezuela	Standard (N. J.) holds 25 interest in Mende Grande's Venezuela production
International Tiefbohr-Kommandit Gesellschaft (ITAG)	Germany, Austria	German interests
Iraq Petroleum Co.	Iraq	Anglo-Iranian Oil Co. 23.75%; Shell Group 23.75%; Near East Development Co. 23.75%; Compagnie Française des Petroles (French Government) 23.75 %; Participations and Investments, Ltd., (British) 5%.
Ishikawa	Japan	
Island Development Co., Ltd.	Canada	Cities Service Oil Co.; Socony-Vacuum Oil Co.
—J—		
Jordan Exploration Co., Ltd.	Palestine	British interests
—K—		
Kalimna Oil Co.	Australia	
Kaliwerke Salzdetfürth	Germany	
Karita Industrial Co.	Japan	
Kern Trinidad Oilfields, Ltd.	Trinidad	British interests
Kermanshah Pet. Co., Ltd.	Iran	Anglo-Iranian Oil Co., Ltd.
Khanaqin Oil Co., Ltd.	Iraq	Anglo-Iranian Oil Co., Ltd.

Continued on page 51

SEE COMPOSITE CATALOG 1948 PAGES 2129 TO 2140

YOU WILL [illegible] TRUCK

By the Remarka[illegible]ormance of

KING [illegible]OLS

TYPE 75 [illegible]G SWIVEL

[illegible]ng)

FOR DRILLING MEDIUM DEPTH[illegible] FOR DEEP SLIM HOLE DRILLING
FOR THE HEAVIER WORK-O[illegible]R DRILLING DEEP WATER WELLS

King 75-RP Swivel with Elevator Shank. Fully described on Pages 2130 & 2131 Composite Catalog.

This swivel is sturdier than[illegible]ing Swivels, but like those other types, it has a ve[illegible]city to weight.

FOREIGN OPERATORS [illegible]el attractive because it can be more readily trans[illegible]d th[illegible]nd heavier, swivels having comparable capacity.

The 75-RP Swivel is available[illegible]CONVENTIONAL BAIL, or it will be furnished with an ELEV[illegible]NK in lieu of a bail.

ALLOY STEEL is used th[illegible] the manufacture of this swivel, except some minor parts ar[illegible], where that metal is more suitable.

THE BEARINGS ARE [illegible]-CONTACT TYPE BALL BEARINGS. The thrust bearing is [illegible]our bearings mounted tandem. These bearings are flush grou[illegible]tched at the factory to assure that each bearing will carry its [illegible]he load. Reverse loads are absorbed by a Single Angular-Cont[illegible]g mo[illegible]ted opposed to the main thrust unit. The manner in whi[illegible]ri[illegible]re mounted will provide ample radial stability for the sw[illegible].

THE SWIVEL [illegible]ovided with automatic grease seals. These seals retain th[illegible]cant. A good grade of ball bearing grease should be inj[illegible]/[illegible]rease gun, once or twice per location.

THIS SW[illegible]EL H[illegible]D WASHPIPE OR STUFFING BOX. A moulded RUBBER PACKING[illegible]des a very effective seal and is automatic in its sealing action. A [illegible]D FACED WEAR BUSHING presents a wear resisting surface against [illegible]acking.

The packin[illegible]quickly and easily adjusted for wear. The packing and wear bushin[illegible]n be readily renewed, within a very few minutes, through openings in [illegible]lower part of the swivel housing. This can be done without removing [illegible]other parts from the swivel.

Sold through your supply store

Export: **R. S. STOKVIS & SONS, Inc.**

17 Battery Place, New York 4, N. Y.

See 1948 Composite Catalog (Pages 2129 to 2140) for other King Tools

With Conventional Bail

PRINCIPAL OIL COMPANIES—Operating Outside United States

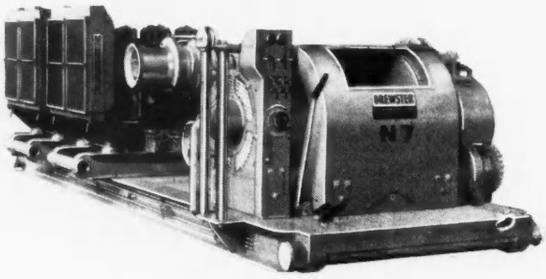
Continued from page 49

COMPANY	Location of Producing Fields or Concessions	OWNERSHIP
Khaneh Pet. Co.	Iraq	Iraq Pet Co.; Anglo-Iranian Oil Co.
Kohle-Öl-Union von Busse A.G.	Germany	
Koller, Ferd., and Sohn	Germany	German interests
Kuwait Oil Co., Ltd.	Kuwait	Gulf Oil Copr. 50%; Anglo-Iranian Oil Co. 50%
—L—		
La Junta Pet. Co.	Colombia	The Texas Co.
Lebanon Pet. Co.	Lebanon	Iraq Pet. Co.
Lion Oil Refining Co.	Canada	American interests
Little Narrows Pet. Co.	Canada	Canadian interests
Lloyd Oil Producers	Canada	Canadian interests
Lobitos Oilfields, Ltd. (Compañia Petrolera Lobitos)	Peru	British interests
—M—		
MacMillan Pet. Corp.	Sicily	American interests
Maden Tetkik ve Arama Enstitüsü	Turkey	Turkish government
Magyar Amerikai Olajipari Részvénytársaság (MAORT)	Hungary	Standard Oil Co. (N.J.)
McColl-Frontenac Oil Co.	Canada	The Texas Co. 49%
Mene Grande Oil Co.	Venezuela	Gulf Oil Corp.
Mexico-Cities Service Pet. Corp.	Mexico	Cities Service Company
Mosul Pet. Co., Ltd.	Iraq	Iraq Pet. Co.
Murilla Oil, Ltd.P	Austraila	Australian interests
Muskeg Syndicate	Canada	Gulf, Shell, Imperial, Socony-Vacuum, McColl-Frontenac
—N—		
Nassau Oil Mining Co., Ltd.	Bahamas	British interests
Naval Petroleum Reserve Operating Committee	Alaska	U.S. Government
Near East Development Company	Iraq (Owns interest in Iraq Pet. Co.)	Standard Oil Co. (N. J.); Socony-Vacuum Oil Co.
N. V. Nederlandsche Aardolie Mij.	Netherlands	50% Standard (N.J.); 50% N. V. de Bataafsche Pet. Mij.
Nederlandsche Indische Aardolie Mij.	Sumatra	50% Shell Group; 50% Netherlands Gov't.
Nederlandsche Nieuw Guinee Pet. Mij.	Netherlands New Guinea	40% Shell Group; 40% Standard-Vacuum 20% Standard Oil of Calif. and The Texas Co.
Nederlandsche Olie Mij.	Venezuela	Shell group.
Nederlandsche Pacific Pet. Mij.	Netherlands Indies	Standard Oil of Calif. 50%; The Texas Company 50%.
N. V. Standard-Vacuum Pet. Mij.	Netherlands Indies	Standard-Vacuum Oil Co.
New Brunswick Oilfields, Ltd.	Canada	American and Canadian interests.
Niederdonau Erdol G. m. b. H.	Austria	German (DEA, Wintershall, Pressag, Elwerath Co's)
Nippon Oilfield Co.	Japan	Japanese interests
Northwestern Utilities, Ltd.	Canada	
Nova Scotia Oil and Gas Co., Ltd.	Canada	
—O—		
Oldenburger Erdoel G.m.b.H.	Germany	Standard Jersey 33⅓%; Socony-Vacuum 33⅓%; Shell 33⅓%
Orinoco Oil Co. of Venezuela	Venezuela	Pure Oil Co.
—P—		
Pancoastal Oil Co., C. A.	Venezuela	Pantepec Oil Co., C. A.
Pantepec Oil Co., C. A.	Venezuela	Pantepec Oil Co.
Pechelbronn S. A. d'Exploration Miniere	France	French government
Peninsular Oil Corp., Ltd.	Canada	
Petróleos Ariguani	Colombia	50% Tropical Oil Co.; 50% Colombian interests
Petróleos Mexicanos (Pemex)	Mexico	Mexican government
Petroleum Concessions, Ltd.	Hadhramaut	Iraq Pet. Co.
Petroleum Development, Ltd.	Cyprus, Omank, & Dhofar Palestine, Qatar, Trucial Coast	Iraq Pet. Co.
Petropolis Oil Co.	Ecuador	Ecuadorian interests
Phillips Petroleum Co.	Canada	Phillips Pet. Co.
Phillips Venezuelan Oil Co.	Venezuela	Phillips Pet. Co.
Pictou Pet. Co., Ltd.	Canada	
Premier (Trinidad) Oilfields, Ltd.	Trinidad	British interests
"Preussag" Preussische Bergwerke und Hütten Aktiengesellschaft	Germany	German government
Princess Brooks Syndicate	Canada	Cal. Standard, Princess, Pacific, Globe, Calgary Gas Co., McMann Synd.
—Q—		
Quaich Oil Corporation, Ltd	Canada	
—R—		
Ram River Oils	Canada	
Reemtsma, Ph	Germany	
Régie Atuônome des Pétroles (R.A.P.)	France	French government and private interests
Richfield Oil Corp.	Australia	
Richmond Exploration Co.	Venezuela	Standard Oil Co. of Calif.
Richmond Petroleum Co.	Colombia	Standard Oil Co. of Calif.
Rio Bravo Oil Co.	Canada	Superior Oil Co. of Calif.
Ritz, Louis, and Company	Germany	
Rohoel Gewinnungs Aktiengellschaft (RAG)	Austria	Socony-Vacuum Oil Co. 50%; Shell group 50%
Romano Americana	Roumania	Standard Oil Co. (New Jersey)
Roma Blocks Oil Co.	Australia	
Roma North Oil Co.	Australia	
Roma Oil Corp., Ltd.	Australia	
Roxana Oil Co.	Canada	
—S—		
Saito Oil Company	Japan	
Sarawak Oilfields, Ltd.	Sarawak	Shell group
Saskatchewan Federated Cooperatives, Ltd.	Canada	Canadian interests
Schachtbau and Tiefbohr-Gesellschaft	Germany	German government
Shell Exploration New Brunswick	Canada	Shell group
Shell Oil Co. of Canada	Canada	
Shell Co. of Ecuador	Ecuador	Shell group
Shell Overseas Exploration Co., Ltd.	Bahamas	Shell group
Shell (Queensland) Dev. Pty., Ltd.	Australia	
Shunda Oils, Ltd.	Canada	
Sinclair-Panama Oil Corp.	Panama	Sinclair Oil Corp.
Sindicato Ganadero Colombiano	Colombia	The Texas Co.
S. A. Petrolera Las Mercedes	Venezuela	The Texas Company 50%; Caracas Pet. Co. 50%
Sociedad De Fomento Petrolero	Colombia	Socony-Vacuum Oil Co.
Societa Italiana del Petrolio el Affini (NAFTA)	Italy	Shell group
Societa Petrolifera Italiana (SPI)	Italy	Standard Oil Co. (N. J.)
Société Cherifienne des Pétroles	Morocco	French and Moroccan governments
Société Nationale des Pétroles D'Aquitaine	France	French government 55%; French private interests 45%
Société Nationale des Pétroles du Languedoc Mediterraneen	France	French government 55%; French private interests 45%
Société Nationale de Recherche et d'Exploitation de Pétrole d'Algerie (SNREPAL)	Roumania	British interests
Socony-Vacuum Oil Co., C. A.	Venezuela	Socony-Vacuum Oil Co.
Socony-Vacuum Oil Co., Inc.	Egypt	Socony-Vacuum Oil Co.
Socony-Vacuum Exploration Co.	Canada	Socony-Vacuum Oil Co.
Socorro Petroleum Co.	Colombia	The Texas Co.
Sovmagnafta Company	Hungary	Hungarian government 50%; Russian government 50%. Since war operating all oil properties in Hungary
Sovrompetrol Oil Co.	Roumania	Russian and Roumanian governments. Now operating prewar properties of Concordia (Belgium), Columbia (French), Creditul Minier, Redeventza and IRDP companies
Standard Amerikaansk Pet. Co.	Netherlands	Standard Oil Co. (N. J.)
Standard Oil (Bahamas), Ltd.	Bahamas	Standard Oil Co. (N. J.)
Standard Oil of B.C. Nassau Explorations Ltd.	Canada	
Standard Oil Co. of Egypt	Egypt	Stnadard Oil Co. (N. J.)
Standard Oil Co., S. A. Argentina	Argentina	Standard Oil Co. (N. J.)
Standard Oil Co. of Cuba	Cuba	Standard Oil Co. (N. J.)
Standard Française des Petroles	France	Standard Oil Co. (N. J.)
Standard Pacific Synd. et al	Canada	Cal. Standard, Pacific, Princess, Empire, Homestead, Globe, Phillips, D. C. McDonald
Standard-Vacuum Oil Co.	Netherlands Indies	Socony-Vacuum Oil Co. 50%; Standard Oil Co. (N. J.) 50%
Stapper and Osborn, S. A.	Guatemala	American interests
Steaua Româna	Roumania	German, English, French, Roumanian
Steinberg-Naptha	Austria	German (ITAG, Elwerath)
Structure Drilling Co.	Canada	
Sun Oil Company, Ltd.	Canada	Sun Oil Co.
Superior Oils	Canada	
Sydney Pet. Co.	Canada	
Syndicat d'Etudes et de Recherches Pétrolières en Tunisie	Tunisia	French and Tunisian governments
Syria Pet. Co.	Syria	Iraq. Pet. Co.
—T—		
Tampico Texas Pet. Corp.	Canada	
Tantalum Industrial Holdings Pt., Ltd.	Australia	
Teikoku (Imperial) Oil Co.	Japan	Japanese interest
Texas Petroleum Co.	Venezuela, Colombia	The Texas Co.
Tone Boring Company	Japan	
Transjordan Pet. Co., Ltd.	Transjordan	Iraq Pet. Co.
Trinidad Central Oilfields	Trinidad	
Trinidad Consolidated Oilfields, Ltd.	Trinidad	British interests
Trinidad Leaseholds, Ltd.	Trinidad	British interests
Trinidad Oilfields Operating Co., Ltd.	Trinidad	Standard Oil Co. (N. J.)
Trinidad Pet. Dev. Co., Ltd.	Trinidad	British interests
Tropical Oil Co.	Colombia	Standard Oil Co. (N. J.)
Tubará Oil Company	Colombia	Tropical Oil Company
—U—		
Union Oil Co. of California	Canada	American interests
Union Oil Paraguay	Paraguay	Union Oil Co. of Calif.
United British Oilfields of Trinidad, Ltd.	Trinidad	Shell group
—V—		
Vacuum Oil Co. Pty., Ltd.	Australia	Standard-Vacuum Oil Co.
Vanalta Synd.	Canada	
Venezuela Oil Concessions, Ltd.	Venezuela	Shell group
Venezuela Pet. Co.	Venezuela	Sinclair Oil Corp.
Vera Oilfields, Ltd.	Canada	
—W—		
Wesreserve Oil Co., Ltd.	Canada	
Westdeusche Bohrgesellschaft (Siep and Company)	Germany	
Wintershall Aktiengesellschaft	Germany, Austria	
—Y—		
Yacimientos Petrolifera Fiscales Bolivianos	Bolivia	Bolivian government
Yacimientos Petroliferos Fiscales (Y.P.F.)	Argentina	Argentine government
—Z—		
Zinc Coroporation, Ltd.	Austraila	Australian interests
Zulia Petroleum Corp.	Canada	

DRILLERS' CHOICE

N-10 FOR DRILLING TO 10,000'

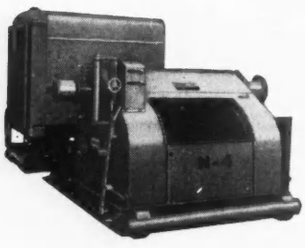
The N-10 is the perfect rig for deep well drilling. Completely air controlled from centralized control panel. Easily portable on single skid. Self energizing, self equalizing 10" x 46" brakes. Oilbath roller-chain compound.



N-7 FOR DRILLING TO 7500'

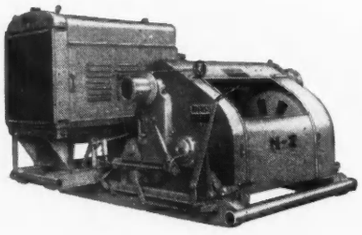
The N-7 is a streamlined and compact drawworks mounted on a single skid. All controls air operated from control panel at driller's position. 500 H.P. transmission; 8 drum speeds. Full wrap 9" x 46" brakes.

BREWSTER *Unitized* DRAWWORKS



N-4 FOR DRILLING TO 4500'

Featuring the power saving fluid drive torque converter, the N-4 has air operated controls and a centralized control panel. Unitized on single skid. Air clutches. Powerful 8" x 40" brakes.



N-2 FOR DRILLING TO 2000'

The N-2 is designed for the driller who needs a small compact rig for drilling to 2000' or servicing wells to 6000'. Transmission has 4 speeds forward and one reverse. Big 6" x 36" brakes.

BREWSTER *Drilling Equipment*

Sold by: BOVAIRD SUPPLY CO. • REAMS SUPPLY CO. • INDUSTRIAL SUPPLY CO.
APEX EQUIPMENT CO. • MURRAY BROOKS, INC. • IN CANADA: HALEY SUPPLY CO.
Export Sales: BAIRD SUPPLY CO., INC., 420 Lexington Ave., New York 17, N. Y.

CONVERSION FACTORS

Crude Oil Conversion Factors

Country	BARRELS PER TON			TONS PER BARREL	
	Long Tons	Metric Tons	Short Tons	Long Tons	Metric Tons
North America:					
Canada	7.891	7.766	7.046	.12673	.12877
Mexico	7.281	7.166	6.501	.13734	.13955
United States	7.459	7.341	6.660	.13406	.13621
South America:					
Argentina	7.134	7.021	6.370	.14017	.14242
Bolivia	7.841	7.717	7.001	.12754	.12959
Colombia	7.143	7.030	6.378	.13999	.14224
Ecuador	7.707	7.585	6.881	.12975	.13183
Peru	7.661	7.540	6.840	.13054	.13264
Trinidad	7.193	7.079	6.422	.13903	.14126
Venezuela	6.958	6.848	6.212	.14372	.14603
Europe:					
Albania	6.706	6.600	5.988	.14912	.15151
Austria	6.897	6.788	6.158	.14500	.14733
Czechoslovakia	6.891	6.782	6.153	.14513	.14746
England	7.440	7.322	6.643	.13440	.13656
France	7.177	7.064	6.408	.13933	.14157
Germany	7.363	7.247	6.574	.13581	.13799
Hungary	7.754	7.631	6.923	.12896	.13103
Italy	7.800	7.677	6.964	.12821	.13027
Poland	7.526	7.407	6.720	.13288	.13501
Roumania	7.525	7.406	6.719	.13288	.13501
U.S.S.R. (Except Sakhalin)	7.390	7.273	6.598	.13532	.13749
Africa:					
Egypt	7.116	7.003	6.354	.14053	.14279
Asia (Middle East):					
Bahrein	7.446	7.328	6.648	.13431	.13647
Iran (Persia)	7.669	7.548	6.847	.13039	.13248
Iraq	7.600	7.480	6.786	.13159	.13370
Kuwait	7.482	7.364	6.680	.13365	.13580
Saudi Arabia	7.537	7.418	6.729	.13267	.13480
Asia (Far East):					
Borneo	7.345	7.229	6.558	.13614	.13833
India	7.355	7.239	6.567	.13596	.13814
Japan	7.143	7.030	6.378	.13999	.14224
Netherlands Indies	7.911	7.786	7.063	.12641	.12844
Sakhalin (U.S.S.R.)	6.930	6.820	6.188	.14430	.14662
Sarawak	6.762	6.655	6.038	.14788	.15025

A.P.I. Gravity Conversion Factors

Gravity	BARRELS PER TON			TONS PER BARREL	
	Long Tons	Metric Tons	Short Tons	Long Tons	Metric Tons
28° Crude Oil	7.220	7.106	6.446	.1385	.1407
32° Crude Oil	7.401	7.284	6.608	.1351	.1373
36° Crude Oil	7.582	7.462	6.770	.1319	.1340
40° Crude Oil	7.763	7.641	6.931	.1288	.1309
44° Crude Oil	7.945	7.819	7.094	.1259	.1279

Conversion Factors for Lengths, Areas, Weight and Volumes

Acres multiplied by:
43,560 = square feet
4840 = square yards
4046.873 = square meters
0.00156 = square miles
0.00405 = square kilometers
0.4047 = hectares
5645.4 = square varas (Texas)
40.47 = ares

Atmospheres (at mean sea level) multiplied by:
14.70 = pounds per square inch
76 = centimeters of mercury
29.92 = inches of mercury

Barrels (U.S.) multiplied by:
9702 = cubic inches
5.6146 = cubic feet
0.15898 = cubic meters
34.9726 = Imperial gallons
42 = U.S. gallons
158.984 = liters
0.1588 = metric tons (water 60° F.) . . . = tons of crude oil (see crude oil conversion factors table)

Centare multiplied by:
1 = square meters

Centimeters, Linear multiplied by:
0.3937 = inches
0.0328 = feet
0.01094 = yards
0.01 = meters
10 = millimeters

Centimeters, Cubic multiplied by:
0.0610 = cubic inches
0.0353 = cubic feet
0.0000013 = cubic yards
0.000001 = cubic meters
0.001 = decimeters

Centimeters, Square multiplied by:
0.1549 = square inches
0.0001 = square meters
100 = square millimeters

Feet, Linear multiplied by:
12 = inches
0.3333 = yards
30.48 = centimeters
0.3048 = meters
0.0003 = kilometers
0.3600 = varas (Texas)

Feet, Cubic multiplied by:
1728 = cubic inches
0.03704 = cubic yards
28,317,016 = cubic centimeters
28.3170 = cubic decimeters

Feet, Cubic, continued
28.317 = liters
0.02832 = cubic meters
7.4805 = U.S. gallons
6.2288 = Imperial gallons
0.17811 = U.S. barrels

Feet, Square, multiplied by:
144 = square inches
0.1111 square yards
0.0929 = square meters
929.03 = square centimeters

Gallons, U.S. multiplied by:
128 = ounces
4 = quarts
8 = pints
0.8327 = Imperial gallons
0.0238 = U.S. barrels
231 = cubic inches
0.1337 = cubic feet
3785.332 = milliliters
3.78553 = liters
3785.43 = cubic centimeters
0.003785 = cubic meters

Gallons, Imperial multiplied by:
277.42 = cubic inches
0.16054 = cubic feet
4.54596 = liters
0.0045461 = cubic meters
1.2010 = U.S. gallons
0.028594 = U.S. barrels

Hectares multiplied by:
2.471 = acres
0.00386 = square miles
10,000 = square meters

Inches, Linear multiplied by:
0.0833 = feet
0.02777 = yards
0.0254 = meters
2.54 = centimeters
25.4 = millimeters

Inches, Cubic multiplied by:
0.000578 = cubic feet
0.000021 = cubic yards
16.3871 = cubic centimeters
0.016387 = cubic decimeters
0.0163865 = cubic liters
0.0000163 = cubic meters
0.0036 = Imperial gallons
0.00433 = U.S. gallons
0.5541 = ounces
0.0173 = quarts

Inches, Square multiplied by:
0.0069 = square feet
0.00078 = square yards
6.4516 = square centimeters
0.0006 = square meters

Kilograms multiplied by:
2.20462 = pounds
.0011023 = short tons

Kilograms Per Square Centimeter multiplied by:
14.233 = pounds per square inch

Kilograms Per Square Meter multiplied by:
0.2048 = pounds per square foot
0.001422 = pounds per square inch
0.0000968 = atmosphers

Kiloliters multiplied by:
35.31 = cubic feet
264.14 = U.S. gallons
1000 = liters

Kilometers multiplied by:
3280.83 = feet
1093.6 = yards
0.6214 = mile
1000 = meters
10,000 = centimeters

Kilometers, Square multiplied by:
247.1 = acres
0.3861 = square miles

Liters multiplied by:
33.8147 = fluid ounces
1.0567 = quarts
0.2642 = U.S. gallons
0.2200 = Imperial gallons
0.00629 = U.S. barrels (oil)
2.202 = pounds (water 60° F.)
61.0251 = cubic inches
0.0353 = cubic feet
1000.03 = cubic centimeters
0.0013 = cubic yards
0.001 = cubic meters

Mercury (Inches) multiplied by:
0.3342 = atmospheres (mean sea level)
0.4912 = pounds per square inch
345.3 = kilograms per square inch

Meters, Linear multiplied by:
39.3701 = inches
3.28084 = feet
1.09361 = yards
0.0006 = miles
100 = centimeters
0.001 = kilometers
1000 = millimeters

Meters, Cubic multiplied by:
61,023.38 = cubic inches
35.31445 = cubic feet
1.30796 = cubic yards

Meters, Cubic, continued:
1,000,000 = cubic centimeters
999.97 = liters
264.17 = U.S. gallons
219.97 = Imperial gallons
6.2898 = U.S. barrels (oil)

Meters, Square multiplied by:
1550 = square inches
10.764 = square feet
1.1959 = square yards
10,000 = square centimeters
0.0001 = hectares
0.0002471 = acres
1 = centare

Miles multiplied by:
5280 = feet
1760 = yards
1609.3472 = meters
1.6093 = kilometers
1900.8 = varas (Texas)
0.8684 = nautical miles

Miles, Square multiplied by:
3,097,600 = square yards
2,589,998 = square meters
258.9998 = hectares
2.5900 = square kilometers
640 = acres

Milliliters multiplied by:
0.0338 = fluid ounces
0.00026 = gallons
0.001 = liters
0.0610 = cubic inches

Millimeters multiplied by:
0.03937 = inches
0.001 = meters

Ounces, Fluid multiplied by:
0.0078 = gallons
1.8047 = cubic inches
0.0295 = liters
29.5729 = milliliters
28.35 = grams
16 = pounds

Poods multiplied by:
36.113 = pounds

Pounds multiplied by:
16 = ounces
0.0005 = short tons
0.4536 = kilograms
0.0277 = poods

Pounds Per Square Inch multiplied by:
0.06804 = atmospheres

Pounds Per Square Inch, continued
703.066 = kilograms per square meter
2.036 = inches of mercury

Tons, Long multiplied by:
2240 = pounds
1.01605 = metric tons
1.120 = short tons
1016 = kilograms

Tons, Metric multiplied by:
0.9842 = long tons
2204.6223 = pounds
1.1023 = short tons
1000 = kilograms
6.297 = U.S. barrels (water 60° F.)

Tons, Short multiplied by:
2000 = pounds
0.8929 = long tons
0.9072 = metric tons
907.2 = kilograms

Varas multiplied by:
2.7408 = feet (in Mexico)
2.7425 = feet (in Chile, Peru, Spain)
2.8408 = feet (in Argentina)
3.6083 = feet (in Portugal)
2.775 = feet (in Texas)
0.838 = meters (in Mexico)
0.8359 = meters (in Chile, Peru, Spain)
0.866 = meters (in Argentina)
0.8467 = meters (in Texas)
1.1 = meters (in Portugal)

Varas, Square multiplied by:
0.0001774 = acres

Yards, Linear multiplied by:
36 = inches
3 = feet
0.9144 = meters
91.4402 = centimeters
0.1200 = varas

Yards, Cubic multiplied by:
46.656 = cubic inches
27 = cubic feet
764,559.4 = cubic centimeters
764.6 = liters
0.76455 = cubic meters

Yards, Square multiplied by:
1296 = square inches
9 = square feet
8361.307 = square centimeters
0.8361 = square meters

MASON-NEILAN REGULATOR CO.

1199 Adams St., Boston 24, Mass., U. S. A.

ATLANTA 3 . . . . . 101 Marietta Street
BUFFALO 2 . . . . . Jackson Bldg.
CHICAGO 11 . . . . . Tribune Tower
CINCINNATI 2 . . . . . 626 Broadway
CLEVELAND 14 . . . . Union Commerce Bldg.
HOUSTON 1 . . . . . 3611 Clinton Drive
LOS ANGELES 23 . . . . 1457 So. Concord St.

MASONEILAN

NEW YORK 6 . . . . . 19 Rector St.
PHILADELPHIA, 6908 Market St., Upper Darby, Pa.
PITTSBURGH 22 . . . . . Clark Bldg.
SAN FRANCISCO 5. . . . . 198 Second Street
ST. LOUIS 3 . . . . . 2832 Olive St.
TULSA 3 . . . . . 1011 South Main St.

Mason Regulator Co. of Canada, Ltd., 620 Cathcart St., Montreal, 454 King St. W., Toronto

Recording Pressure Gauges; Recording Thermometers; Indicating and Recording Air Operated Pressure and Temperature Controllers; Air Operated Potentiometer Controllers, Direct Connected and Pilot Operated Ball Float Liquid Level Controllers; Displacement Type Liquid Level Controllers; Control Valves; Control Valve Positioners; Reducing and Back Pressure Regulators; Pump Pressure Regulators; Differential Pressure Regulators; Vacuum Regulators; Pump Speed Governors; Strainers.

No. 11 PRV

PRESSURE REGULATING VALVES

A complete line of reducing valves, back pressure regulators, differential pressure regulators, vacuum and vapor recovery regulators; for steam, gas, oil, air or water service. Direct operated and pilot operated (air, gas or hydraulic types) for large or small lines, high or low pressures. Stainless steel trim standard; iron, steel and bronze construction. Sizes range from ⅛″ to 10″, pressure ratings to 4000 lbs. Special equipment built to specifications.

No. 27
Reducing Regulator

DIAPHRAGM CONTROL VALVES

A complete, modern line for steam, oil, air, water or gas. Besides standard types a selection of butterfly valves, angle valves and Saunders Patent valves. Also valves for extremely small flows (Nos. 107 and 108). Plug types available are Percentage Parabolic in valves 1″ through 4″, Percentage V-Port in 1″ through 16″; Percentage Piston standard in port sizes ⅛″ through ¾″; Quick-Opening; and Needle type for very small orifices. Equal Percentage flow characteristics through wide flow range with most types. Iron and/or steel with stainless steel trim are standard. Bronze, stainless steel or other special alloy bodies are available. Air fin bonnets for extreme temperatures. Most can take manual operation accessories, position indicators and valve positioners. Special equipment built to specifications.

No. 37
Control Valve

No. 107
Control Valve

CONTROL VALVE POSITIONERS

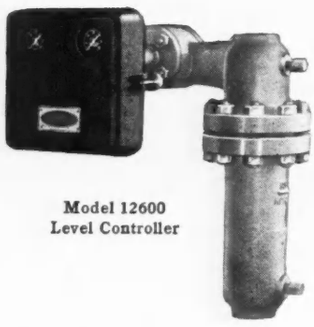
A completely new design, with several standard types for positioning direct or reverse superstructure diaphragm control valves or diaphragm motors. Also for split range operation and motion transmission.

No. 7400-1
Control Valve Positioner

Positioner Mounted on Valve

LIQUID LEVEL CONTROLLERS

12000 Series. For all usual liquid level control, measurement and signaling applications, including interface service. *Ranges* between 14 inches and 15 feet. Working pressures to 1500 psi. Temperatures to 750° F. and —30° F. Specific gravity settings 0.5 to 1.2 or 0.8 to 2.0. *Ten mounting types,* screwed or flanged: side; top; top and bottom; top and side; side and bottom connections to vessel. Controller case mounting right or left hand—reversible in field without extra parts. *Controller mechanisms;* Two-position Differential Gap, Proportional or Proportional-Reset Control; Pneumatic Transmission; Pneumatic Signal Switch; Duplex Control; Control plus Pneumatic Transmission or Pneumatic Signal Switch. *Construction:* Torque tube assembly—inconel standard; stainless steel, monel or phosphor bronze. Displacer chamber steel, bronze or iron.

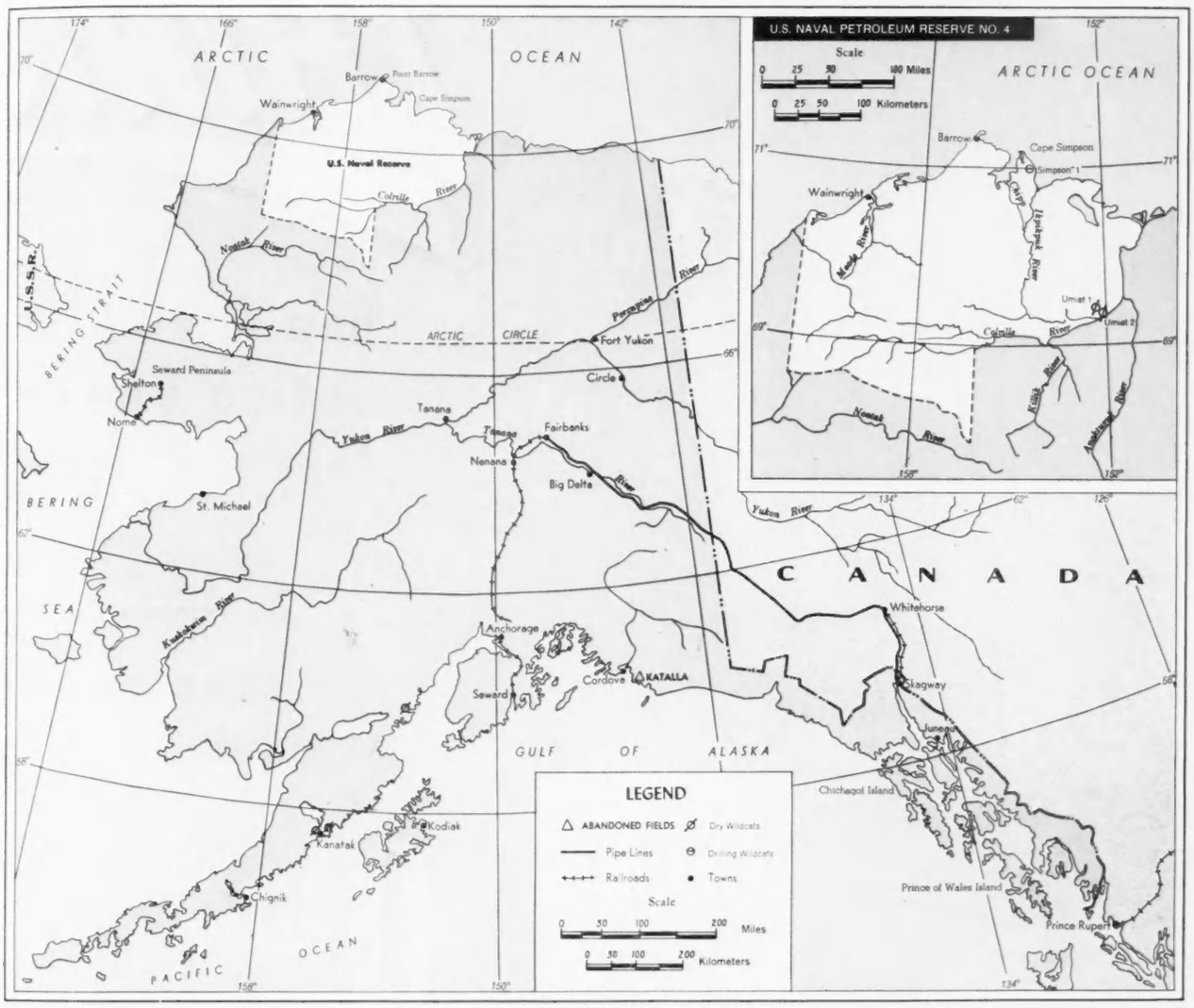


Model 12600
Level Controller

Ball Float Types. Direct connected and pilot operated varieties. Float chamber, flange and shaft types available. Air fin yokes for extreme temperatures, ratings up to 600 lb. All have pressure lubricator. Rugged construction.

Model 12600-00
Duplex Level Controller

ALASKA



ACTIVITY in Alaska is currently centered in the United States Naval Petroleum Reserve No. 4, a region covering about 35,000 square miles in the extreme northwest, near Point Barrow and lying north of the Arctic Circle.

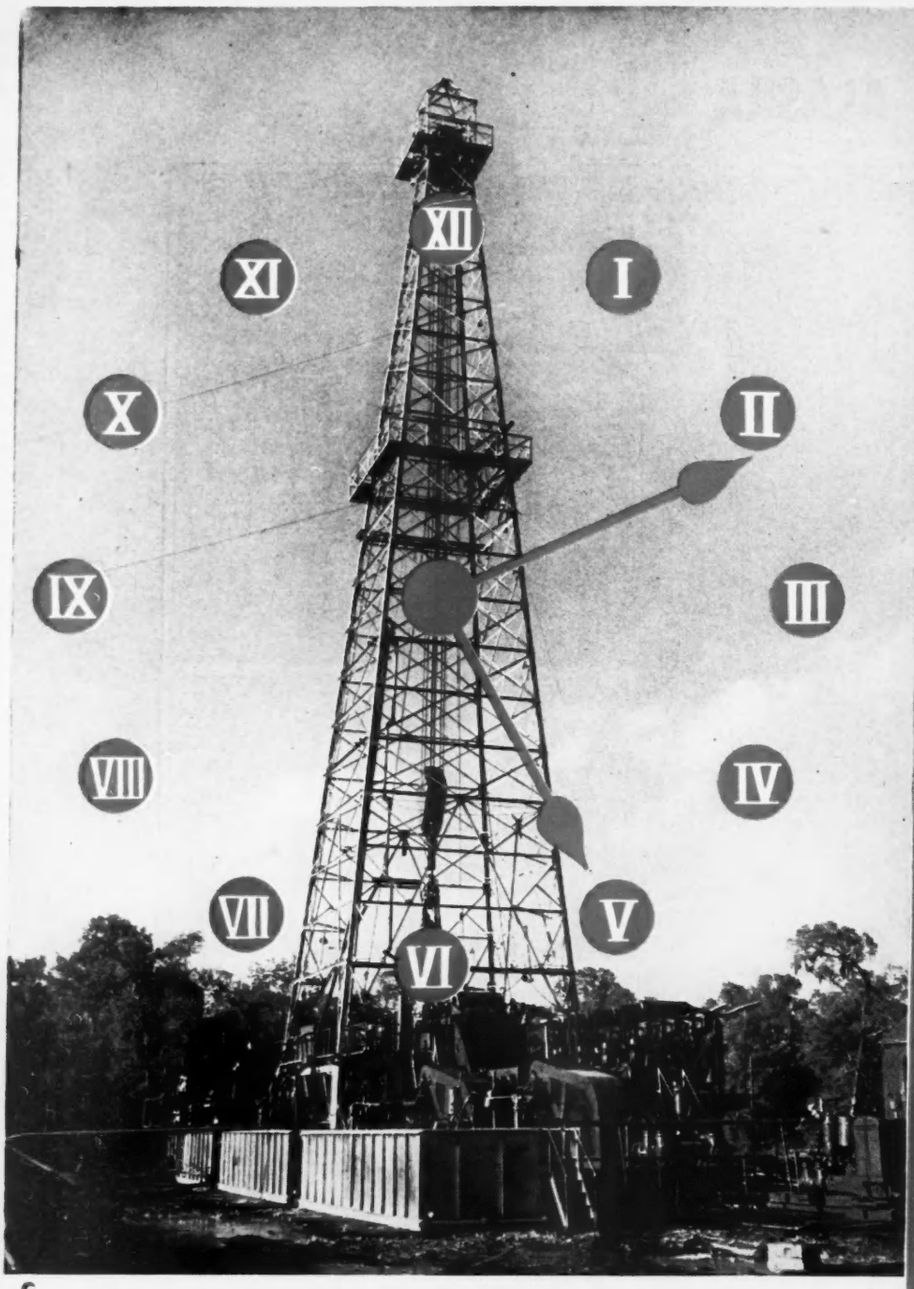
Operations under the direction of an Operating Committee headed by Commodore William G. Greenman, USN (Retired), have been carried forward steadily for the past three years. The actual machinery has been placed in the hands of Arctic Contractors, Inc., which is conducting geological and geophysical operations in addition to wildcat drilling. During 1947, following abandonment of Umiat 1 which went to 6005 feet, Umiat 2 was drilled 6½ miles to the east, carried to 6212 feet and found showings of oil in the upper part of the hole, though not in commercial quantities. There was some question as to whether either of the deep tests had penetrated formations of Lower Cretaceous age, but paleontological work may establish this at a later date. In this area a core test drilled on the top of the structure found oil at 572 feet from which it pumped at the rate of 15 barrels a day.

During the year a well was started in the Cape Simpson area, near which extensive oil seepages occur, and early in 1948 had been taken to a depth of 6171 feet where it was in the Upper Cretaceous. Before spudding this well a structure was defined by seismic geophysical methods. A number of other structures have been located by surface geology and gravitymeter work and will doubtless come in for attention during the period of exploration allotted by the congressional appropriation, which expires at the end of June, 1950.

Two other areas in Alaska have received attention: The Alaska Peninsula-Cook Inlet area has seen several wildcat wells drilled during the past 50 years in an effort to establish production in an area some 250 miles long. In 1939 Iniskin Drilling Company's Iba 1 drilled to 8775 feet, finding a small amount of high-gravity oil. Drilling on Iniskin Peninsula dates back as far as 1898 when Alaska Petroleum Company is credited with finding some oil and gas between 500 and 700 feet in depth in wells drilled between then and 1903.

The Katalla district is the site of an oil field opened in 1901 on the strength of surface seepages discovered in 1896. Wells in the area were between 365 and 1800 feet deep, and produced about 150,000 barrels of high-gravity oil during the period from 1902-1933. A small local refinery processed the oil for use by the fishing fleet and as fuel used locally. The area has been abandoned since the refinery burned in 1933.

A wildcat was drilled in the Yakataga district by General Petroleum Company in 1926 on the strength of seepages on creeks near the coast east of Cape Yakataga, but no showings were found.



THINK

how much it's costing you in lost rig time

NOT

to have your rigs equipped with

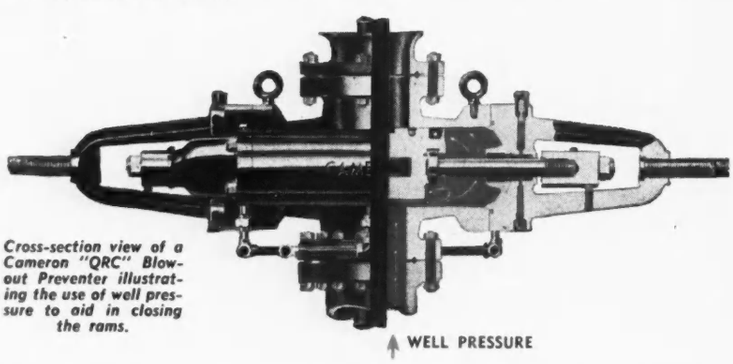
Quick Ram Change

QUICKLY REPAYS COST

Cameron's Great New Pressure-Operated Blowout Preventer

Aside from the superior mechanical features of Cameron Type "QRC" Blowout Preventers which alone would justify their use because of their greater safety and all around utility, these new control units will actually pay for themselves on a few wells thru reduced ram change time. Whereas the large sizes of other models require up to 10 hours, or more, for changing rams, this operation with the "QRC" model requires only a few minutes. With from 3 to 5 ram changes required in drilling the average Gulf Coast well, for example, the saving in rig time is substantial. For this reason, one of the world's largest owners of drilling rigs is presently replacing all of his blowout preventers with Cameron Type "QRC"—(Quickly Repays Cost)!

Other "QRC" features include: High ratio of closing pressure to well pressure—8 to 1 as compared with 3 to 1 on earlier models; compact design—lower overall height, less weight, easier to install and transport; 6000 and 10,000 lbs. test pressure models in 6", 8" and 10" sizes; patented self-feeding ram packers; fluid pressure operation and other time-tested features which, for many years, have established Cameron as the standard of comparison in the pressure control field.



Cross-section view of a Cameron "QRC" Blowout Preventer illustrating the use of well pressure to aid in closing the rams.

CAMERON IRON WORKS, INC.

P. O. BOX 1212, HOUSTON, TEXAS

Export: 74 Trinity Place, New York, N. Y. Oklahoma: 310 Thompson Bldg. Telephone (28970). West Texas: Midland, Telephone (1982). California: Long Beach (P. O. Box 267). Wyoming: 356 N. Wolcott St., Casper. North Louisiana: Bossier City (P. O. Box 425).

CANADA

THE year 1947 has been an important one in the history of Canada's oil industry. Early in the year the discovery of the Leduc field in Alberta, Western Canada, touched off an intensive development and exploration campaign which resulted in rapid expansion of the productive capacity of the Leduc field itself, and likewise led to the discovery of other producing areas, still not fully evaluated at the close of the year.

Of similar importance was the drilling campaign which led to increased activity in the Lloydminister field on the border between Alberta and Saskatchewan. This program was so successful as to cause a four-fold increase in its production for 1947, output from this area amounting to 839,598 barrels for the year.

Despite decreases in the production from Eastern Canada, and the decline in production from the Turner Valley field which is still Canada's largest source of production, it was possible for the nation to produce 7,721,580 barrels during 1947, an increase of 114,305 barrels over 1946. This is of particular importance in a nation which has had to import more than 85 percent of its requirements for many years. It is anticipated that a 20,000-barrel a day deficiency in crude oil supply in the Prairie Provinces of Western Canada which existed last summer will be erased during 1948.

The rapid increase in drilling activity was beginning to make itself felt by mid-year, and resulted in completion of 315 wells in Western Canada, compared with only 182 completions in 1946. Eastern Canada showed a slight decrease with 368 wells in 1947 compared to 404 in 1946.

Leduc was discovered in February by Imperial Oil Company, the discovery producing 1000 barrels daily from Devonian Dolomite at 5066 feet. Subsequent wells found a deeper zone at 5423 feet. By the end of the year its limits had been increased to an area of some 8500 acres, defined only on the south and east, and its reserves have been estimated at no less than 100 million to 150 million barrels of 38-gravity crude. Individual wells are kept at restricted producing rates of 100 to 150 barrels daily, depending on the sand in which they are completed, but flush production tests have recovered as high as 90 barrels per hour. At the end of the year, 31 wells were actually on production, but before the middle of 1948 sixty producers had been completed.

As a result of the discovery there was a rapid expansion of exploratory geophysical and drilling activity throughout the "Alberta Basin" with 35 geophysical crews working, and from 20 to 30 wildcat drilling rigs in operation. At the time of the Leduc discovery only three major companies were exploring in the Alberta Basin: Imperial Oil, McColl Frontenac and Canadian Gulf Oil. Since then the three have been joined by California-Standard, Socony-Vacuum, Stanolind Oil & Gas, Amerada Petroleum, Continental Oil Company and many smaller U. S. and Canadian companies.

In December, Canadian Gulf made a highly promising distillate discovery at Pincher Creek, in the South Alberta foothills, just 15 miles north of the United States border. Finding a 100-foot porous section of Madison limestone at 11,800 feet, the well had an estimated open flow potential of 44 million cubic feet of gas and more than 1000 barrels of 51-gravity distillate daily under high pressure. At the close of the year it was being deepened to test the entire section. The formation is the same from which Turner Valley production comes, and heightens the interest in the southern part of Alberta.

At Lloydminister, formerly a relatively small producer of heavy oil from a series of shallow Lower Cretaceous sand pools, heavy drilling proved up an area approximately 35 miles long and up to 20 miles wide.

Another feature of Western Canada was a substantial addition to the gas reserves with McColl-Frontenac and Union Oil Company of California extending gas fields in the Pakowki Lake region of Southeast Alberta, and bringing in the new gas production at Manyberries and Smith Coulee.

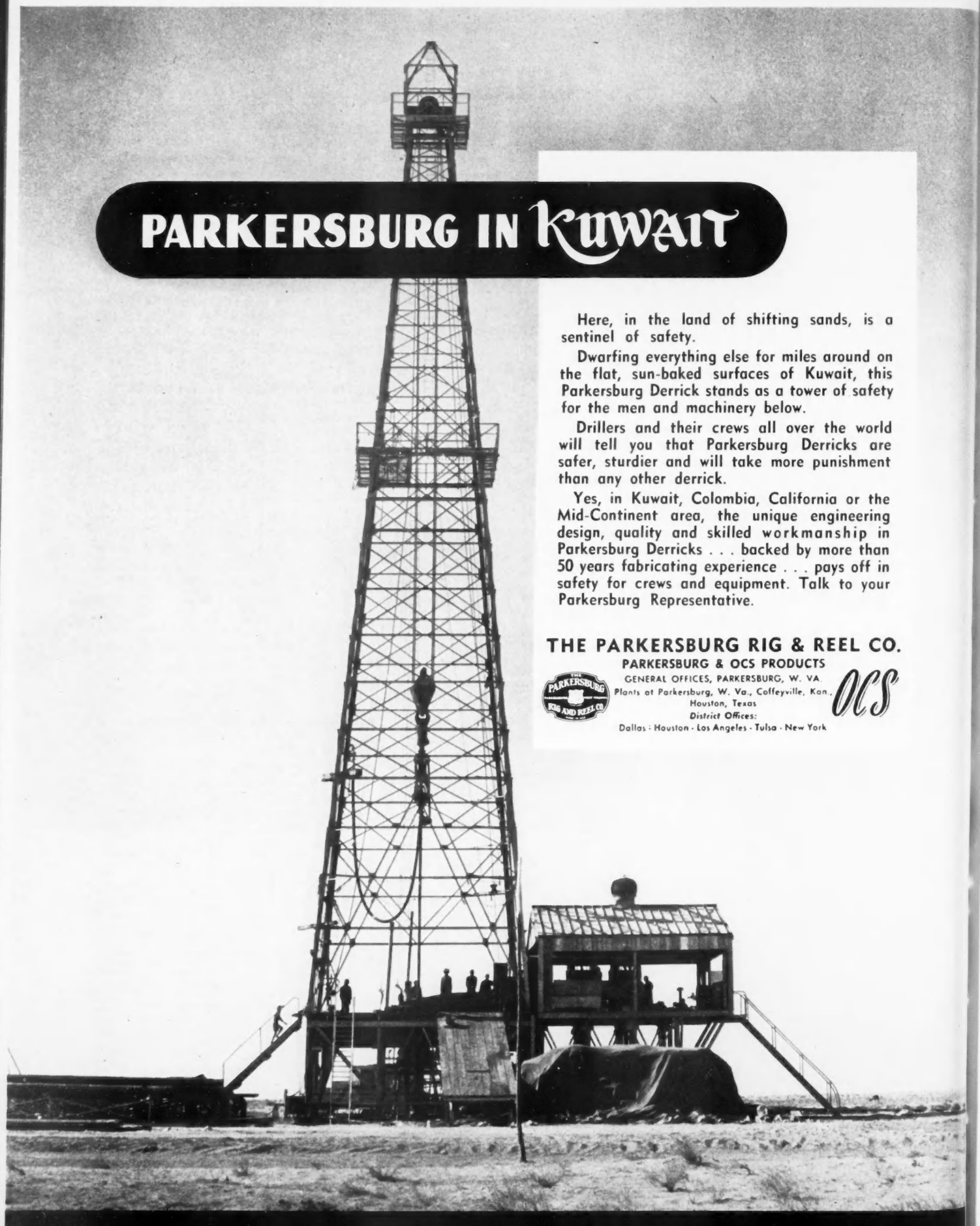
Oil Production and Producing Wells in Eastern Canada

Township and Field	Year of Discovery	Producing Oil Wells End of 1947			Year 1946	Year 1947	Cumulative Through 1947
		Flowing	Art. Lift	Total Prod.			
New Brunswick:							
Stony Creek	1912		27	27	28,500	23,129	413,286
Ontario:							
Becher	1947		10	10	2,347	20,264	22,611
Bothwell and Thamesville	1895		189	189	18,610	14,260	2,780,260
Dawn and Euphemia	1932		2	2	238	163	58,627
Dover, Raleigh and Romney	1917		14	14	4,580	4,545	208,345
Dunwich	1898		22	22	1,621	1,730	196,220
Moore	1904		7	7	259	132	434,432
Mosa	1904		162	162	17,351	19,165	512,145
Oil Springs	1861		493*	493	27,888	25,683	8,080,183
Onondaga	1910		6	6	30		
Petrolia and Enniskillen	1865				43,195	37,458	26,270,458
Plympton	1875		1	1	28		
Sarnia					152	80	315,080
Warwick and Metcalfe	1938		15	15	5,400	2,390	116,390
Totals			948	948	150,499	149,008	39,408,037

* Includes Petrolia Producing Wells.

Producing Wells and Oil Production in Western Canada

PROVINCE AND FIELD	Year of Discovery	Total Producing Wells—End of 1947	Daily at End of 1947	Year 1946	Year 1947	Cumulative Through 1947
Alberta:						
Turner Valley:						
Limestone zone	1936	392	13,550	5,928,474	5,017,292	86,153,717
Shallow zone oil	1914	5	10	8,888	5,058	507,486
Natural Gasoline	....	...	1,355	434,210	427,223	6,289,965
Total, Turner Valley	....	397	14,915	6,371,572	5,449,573	92,951,168
Armelgra	1943	...	.....	.....	.....	462
Bantry	1947	...	.....	.....	30	30
Baxter Lake	1946	...	.....	2,016	664	2,680
Conrad	1944	17	539	212,645	202,929	584,003
Del Bonita–Twin River	1939	...	.....	2,064	3,841	36,766
Dina	1929	1	76	.....	4,159	41,511
Hay Lake	1946	...	.....	1,140	.....	1,140
Jumping Pound	1944	1	4	2,428	2,619	8,518
Keho	....	...	.....	.....	.....	955
Leduc	1947	31	3,218	.....	372,427	372,427
Lloydminster—Blackfoot	1940	51	1,444	76,187	304,707	421,040
Moose Dome	1937	...	.....	.....	.....	8,977
Princess-Steveville	1940	11	249	49,068	43,672	196,014
Provost	1946	...	.....	1,558	115	1,673
Ram River	1944	...	.....	.....	.....	207
Red Coulee	....	...	.....	.....	.....	328,711
Skiff	....	...	.....	.....	.....	8,298
South Princess	1945	4	260	15,885	63,248	83,971
Taber	1937	18	572	206,925	205,236	839,371
Tilley	1942	...	.....	.....	.....	14,513
Vermilion	1939	53	334	183,946	138,402	978,456
Wainwright	1922	7	46	13,098	17,661	253,784
Total Other Alberta Fields	....	194	6,742	766,960	1,359,710	4,183,507
Total Alberta	....	591	21,657	7,138,532	6,809,283	97,134,675
Saskatchewan:						
Lloydminster–Lone Rock	1942	83	2,297	136,836	534,891	688,566
District of MacKenzie:						
Norman Wells	1920	n. a.	626	181,408	228,398	2,394,033
TOTAL WESTERN CANADA	....	674	24,580	7,456,776	7,572,572	100,217,274



PARKERSBURG IN KUWAIT

Here, in the land of shifting sands, is a sentinel of safety.

Dwarfing everything else for miles around on the flat, sun-baked surfaces of Kuwait, this Parkersburg Derrick stands as a tower of safety for the men and machinery below.

Drillers and their crews all over the world will tell you that Parkersburg Derricks are safer, sturdier and will take more punishment than any other derrick.

Yes, in Kuwait, Colombia, California or the Mid-Continent area, the unique engineering design, quality and skilled workmanship in Parkersburg Derricks . . . backed by more than 50 years fabricating experience . . . pays off in safety for crews and equipment. Talk to your Parkersburg Representative.

THE PARKERSBURG RIG & REEL CO.

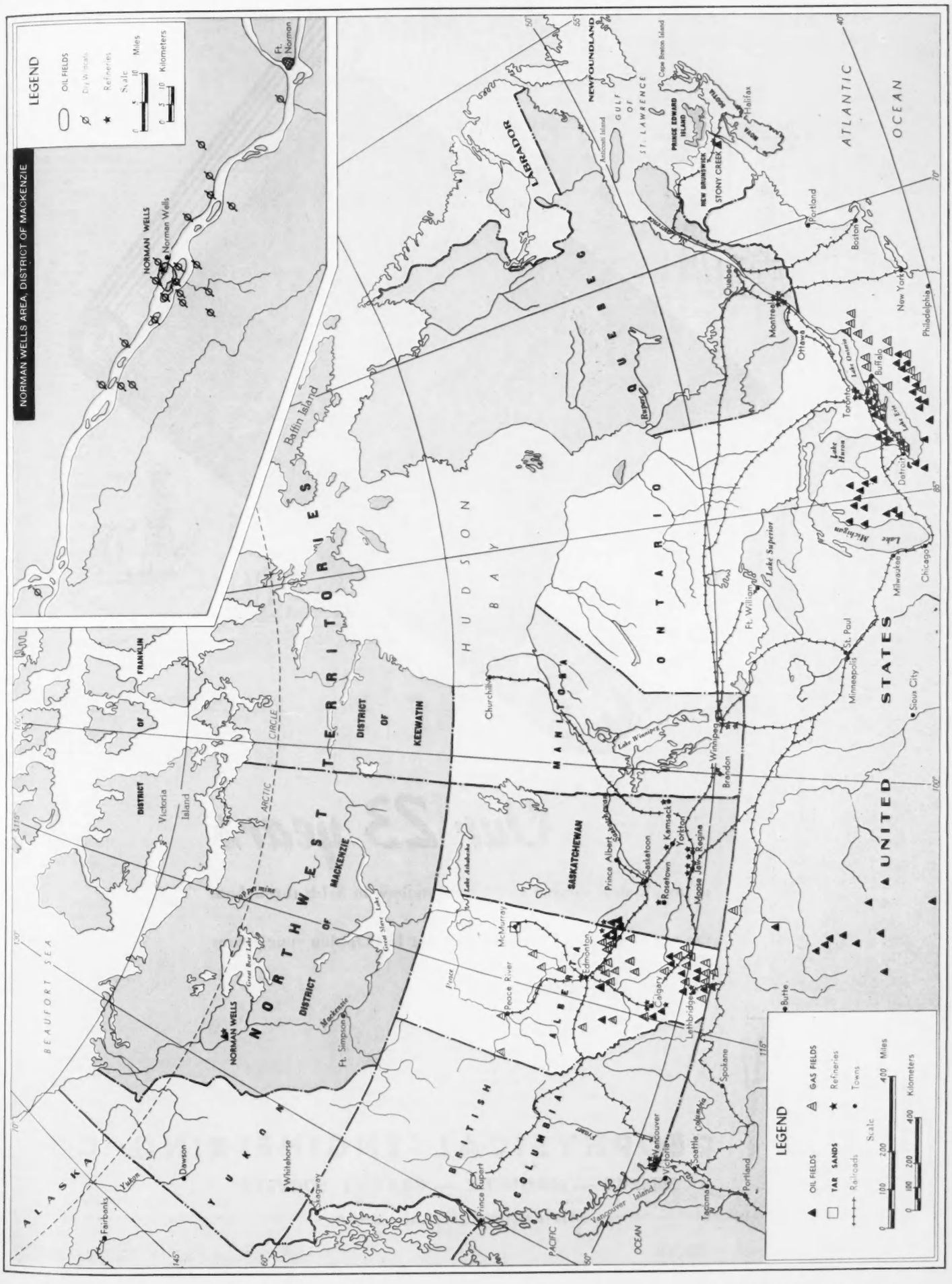
PARKERSBURG & OCS PRODUCTS

GENERAL OFFICES, PARKERSBURG, W. VA.
Plants at Parkersburg, W. Va., Coffeyville, Kan., Houston, Texas
District Offices:
Dallas · Houston · Los Angeles · Tulsa · New York

OCS

PARKERSBURG

CANADA


NORMAN WELLS AREA, DISTRICT OF MACKENZIE
LEGEND
OIL FIELDS
Dry Wildcats
Refineries
Scale
Miles
Kilometers
NORMAN WELLS
Norman Wells
Ft. Norman
LEGEND
OIL FIELDS
GAS FIELDS
TAR SANDS
Refineries
Railroads
Towns
Scale
Miles
Kilometers
ALASKA
YUKON
NORTHWEST TERRITORIES
DISTRICT OF FRANKLIN
DISTRICT OF KEEWATIN
DISTRICT OF MACKENZIE
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
NEWFOUNDLAND
LABRADOR
PRINCE EDWARD ISLAND
NEW BRUNSWICK
NOVA SCOTIA
HUDSON BAY
GULF OF ST. LAWRENCE
BEAUFORT SEA
PACIFIC OCEAN
ATLANTIC OCEAN
UNITED STATES
Fairbanks
Dawson
Whitehorse
Prince Rupert
Vancouver
Victoria
Vancouver Island
Seattle
Portland
Tacoma
Spokane
Butte
Calgary
Edmonton
Lethbridge
Medicine Hat
Regina
Moose Jaw
Saskatoon
Rosetown
Kamsack
Yorkton
Prince Albert
McMurray
Peace River
Fort Simpson
Norman Wells
Great Bear Lake
Great Slave Lake
Mackenzie
Yukon
Liard
Fraser
Churchill
Winnipeg
Brandon
Lake Winnipeg
Lake Athabasca
Lake Superior
Ft. William
Sioux City
Minneapolis
St. Paul
Milwaukee
Chicago
Detroit
Lake Huron
Lake Michigan
Lake Erie
Lake Ontario
Toronto
Buffalo
Ottawa
Montreal
Quebec
Boston
New York
Philadelphia
Portland
Halifax
Cape Breton Island
Anticosti Island
Stony Creek
Baffin Island
Churchill
Arctic Circle

Our 23 years

of geophysical surveys and interpretations in fields throughout the world will be of inestimable value in mapping your course of future oil development.

PETTY

GEOPHYSICAL ENGINEERING CO.

SEISMIC — MAGNETIC — GRAVITY SURVEYS

SAN ANTONIO, TEXAS, U. S. A.

CANADA—Continued

Drilling in Western Canada

PROVINCE AND FIELD	1946 Oil	1946 Gas	1946 Dry	1946 TOTAL Wells	1946 TOTAL Footage	1947 Oil	1947 Gas	1947 Dry	1947 TOTAL Wells	1947 TOTAL Footage	WELLS DRILLING AND SHUT Down at End of 1947 Drlg.	SD	Total
Alberta:													
Athabaska	....	....	.....	.....	.....	....	....	....	.....	2,700	.....	1	1
Brazeau	....	....	....	.....	.....	....	....	1	1	2,531	1	.....	1
Brooks	....	1	1	2	6,807	....	1	....	1	2,310	.....	1	1
Conrad	1	....	....	1	3,026	....	....	....	.....	.....	.....	.....	.....
Del Bonita	....	1	....	1	4,965	1	....	....	1	5,098	.....	.....	.....
Dina	....	....	....	.....	.....	2	....	....	2	3,484	.....	1	1
Duvernay	....	....	....	.....	.....	....	....	....	.....	1,601	.....	1	1
Elk Point	....	3	1	4	14,948	....	....	....	.....	.....	.....	.....	.....
Foremost	....	....	....	.....	.....	....	5	7	12	31,016	.....	.....	.....
Hanna	....	....	....	.....	.....	....	....	1	1	11,336	1	1	2
Jumping Pound	....	1	....	1	10,578	....	....	....	.....	.....	.....	.....	.....
Ledue	....	....	....	.....	.....	32	1	4	37	236,884	10	.....	10
Lloydminster	12	1	2	15	29,273	50	....	2	52	110,304	1	2	3
Medicine Hat	....	2	....	2	2,290	....	10	1	11	21,501	2	.....	2
Moose Dome	....	1	....	1	3,158	....	....	....	.....	.....	.....	.....	.....
Ponoka	....	....	....	.....	.....	....	....	....	.....	6,760	1	.....	1
Princess	2	....	4	6	22,671	3	1	2	6	26,536	1	1	2
Provost	....	5	3	8	24,990	....	....	1	1	2,341	.....	.....	.....
Taber	2	....	....	2	6,460	....	....	2	2	9,346	1	.....	1
Pakowki	....	4	3	7	16,371	....	....	....	.....	.....	.....	.....	.....
Tilley	....	1	....	1	1,300	....	....	....	.....	.....	.....	.....	.....
Tofield	....	....	....	.....	.....	....	....	1	1	5,558	.....	.....	.....
Turner Valley	11	....	2	13	113,810	7	....	....	7	83,205	4	.....	4
Vermilion	....	....	....	.....	.....	....	2	1	3	5,851	.....	.....	.....
Viking Kinsella	....	18	10	28	64,181	....	5	....	5	10,791	.....	.....	.....
Wetaskiwin	....	....	....	.....	.....	....	....	....	.....	14,227	2	.....	2
Wildcats	1	4	31	36	161,829	4	9	40	53	287,565	.....	6	6
Total Alberta	29	42	57	128	486,657	99	34	65	198	881,045	25	14	38
Saskatchewan													
Lloydminster-Lone Rock	39	....	4	43	82,041	104	....	15	119	223,006	.....	.....	.....
Wildcats	....	2	9	11	34,499	....	....	....	.....	.....	.....	.....	.....
Total Saskatchewan	39	2	13	54	116,540	104	....	15	119	223,006	.....	.....	.....
Total Western Canada	68	44	70	182	603,197	203	34	80	*317	1,104,051	24	14	38

Drilling in Eastern Canada

PROVINCE COUNTY AND TOWNSHIP	WELLS COMPLETED IN 1946 Oil	Gas	Dry	Total Wells	Total Footage	WELLS COMPLETED IN 1947 Oil	Gas	Dry	Total Wells	Total Footage
NEW BRUNSWICK:										
Stony Creek	.....	.....	.....	.....	.....	.....	5	.....	5	13,136
NOVA SCOTIA:										
Wildcats	.....	.....	.....	.....	.....	.....	.....	3	3	13,445
ONTARIO:										
Brant:										
Tuscarora	.....	.....	.....	.....	.....	.....	1	.....	1	1,420
Elgin:										
Bayham	.....	6	7	13	14,006	.....	1	1	2	1,994
Malahide	.....	.....	.....	.....	.....	.....	1	2	3	3,153
Yarmouth	.....	.....	.....	.....	.....	.....	4	2	6	11,800
Essex:										
Colchester, N.	.....	.....	.....	.....	.....	.....	.....	1	1	1,150
Malden	.....	.....	.....	.....	.....	.....	1	5	6	5,960
Kingsville	.....	.....	.....	.....	.....	.....	.....	3	3	3,910
Haldimand:										
Haldimand	.....	102	62	164	134,840	.....	86	53	139	108,421
Kent:										
Chatham and Camden Gore	.....	2	5	7	15,011	.....	1	7	8	13,455
Howard	.....	.....	.....	.....	.....	.....	.....	1	1	1,743
Oxford	.....	.....	.....	.....	.....	.....	.....	1	1	575
Raleigh	.....	.....	.....	.....	.....	.....	.....	1	1	3,351
Zone	.....	8	3	11	17,120	.....	2	1	3	4,850
Lambton:										
Dawn	.....	.....	1	1	600	.....	3	1	4	5,965
Bosanquet	.....	.....	.....	.....	.....	.....	.....	1	1	580
Brooke	.....	.....	.....	.....	.....	.....	.....	4	4	5,109
Enniskillen	6	.....	14	20	13,214	.....	.....	5	5	4,185
Euphemia	.....	.....	.....	.....	.....	.....	.....	3	3	3,909
Moore	.....	.....	7	7	7,097	.....	3	9	12	16,830
Plympton	.....	.....	.....	.....	.....	.....	.....	2	2	5,123
Sarnia	.....	.....	1	1	490	.....	2	1	3	3,866
Sombra	.....	.....	.....	.....	.....	9	4	14	27	61,448
Sombra	.....	.....	.....	.....	.....	9	4	14	27	51,448
Wildcats	.....	.....	.....	.....	.....	.....	3	2	5	11,699
Lincoln:										
Caistor	.....	.....	.....	.....	.....	.....	12	4	16	7,681
Gainsboro	.....	11	1	12	5,705	.....	1	.....	1	540
Norfolk:										
Norfolk	.....	14	26	40	43,158	....	18	6	24	30,533
Welland:										
Welland	.....	35	9	44	30,564	.....	48	11	59	48,508
Middlesex:										
Metcalfe	.....	.....	.....	.....	.....	2	.....	4	6	2,664
Mesa	15	.....	1	16	7,403	10	.....	3	13	5,075
Other Areas:	5	27	37	68	106,408	.....	.....	.....	.....	.....
Totals	26	205	173	404	380,605	21	196	151	368	392,178

a favorite for running and squeeze cementing long strings of liner... the

TIW TYPE LS LINER CEMENTING ASSEMBLY

This assembly is used to run and squeeze cement long strings of blank liner through one or more producing formations. It is especially adaptable to wells which are making water from an unknown source.

It uses the T-I-W Type L Liner Packer and Setting Tool — proved through years of use to be completely reliable.

WASH PIPE MAY BE ELIMINATED

This is an especial advantage when long strings are cemented since there is no danger of cementing wash pipe in place. However, if a wash pipe is desired, it may be run.

A DOUBLE PACKOFF

. . . consisting of inverted cup seals of proven design completely protects the packer assembly from cement.

THE DOUBLE BACK PRESSURE VALVE

. . . positively stops back flow of cement into liner. This valve will withstand extreme squeeze pressures.

Where liner is suspended off bottom, this assembly may be run with a T-I-W Liner Hanger.

For simple operation and positive results, you can't beat the T-I-W Type LS Liner Setting Assembly.

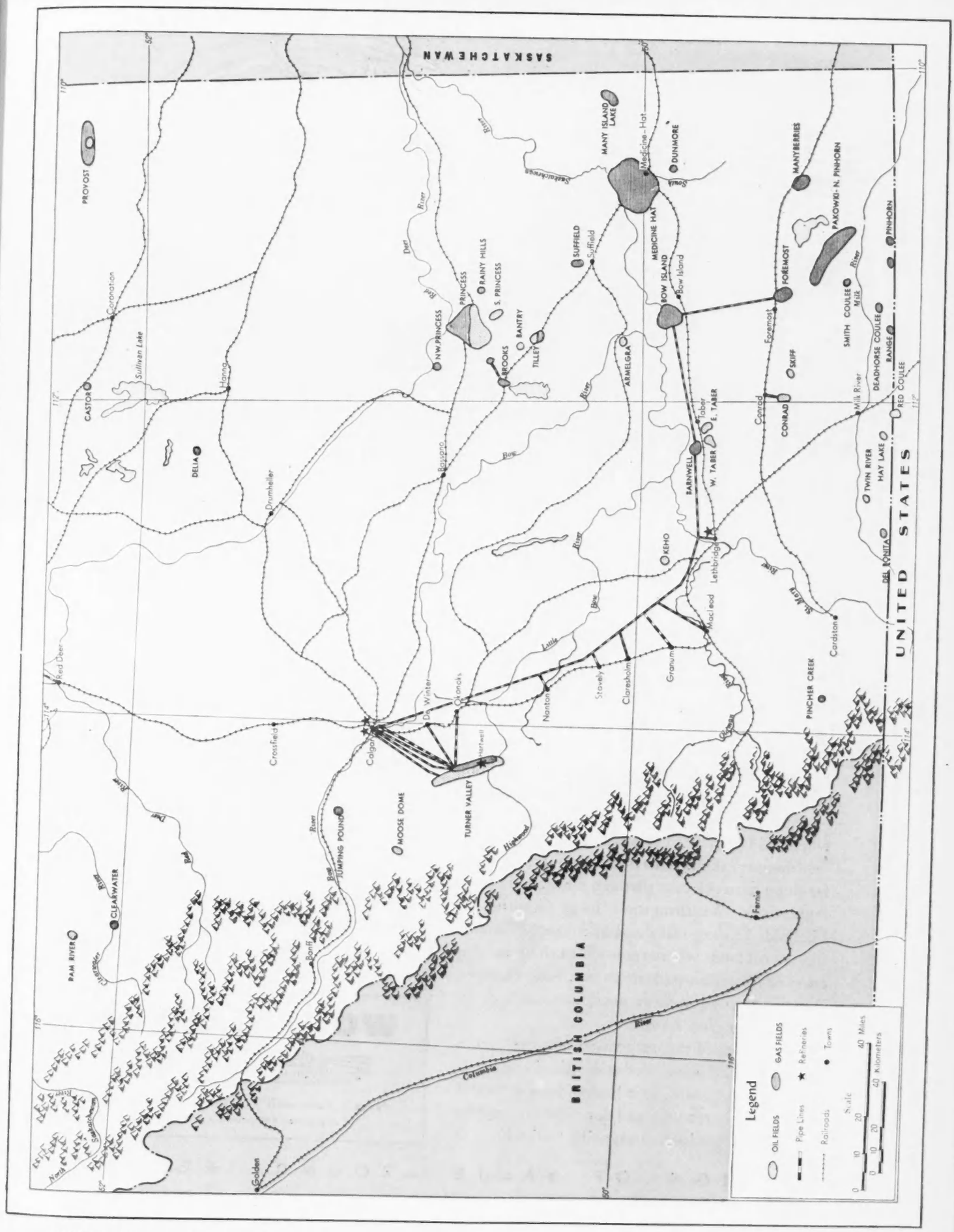
TEXAS IRON WORKS

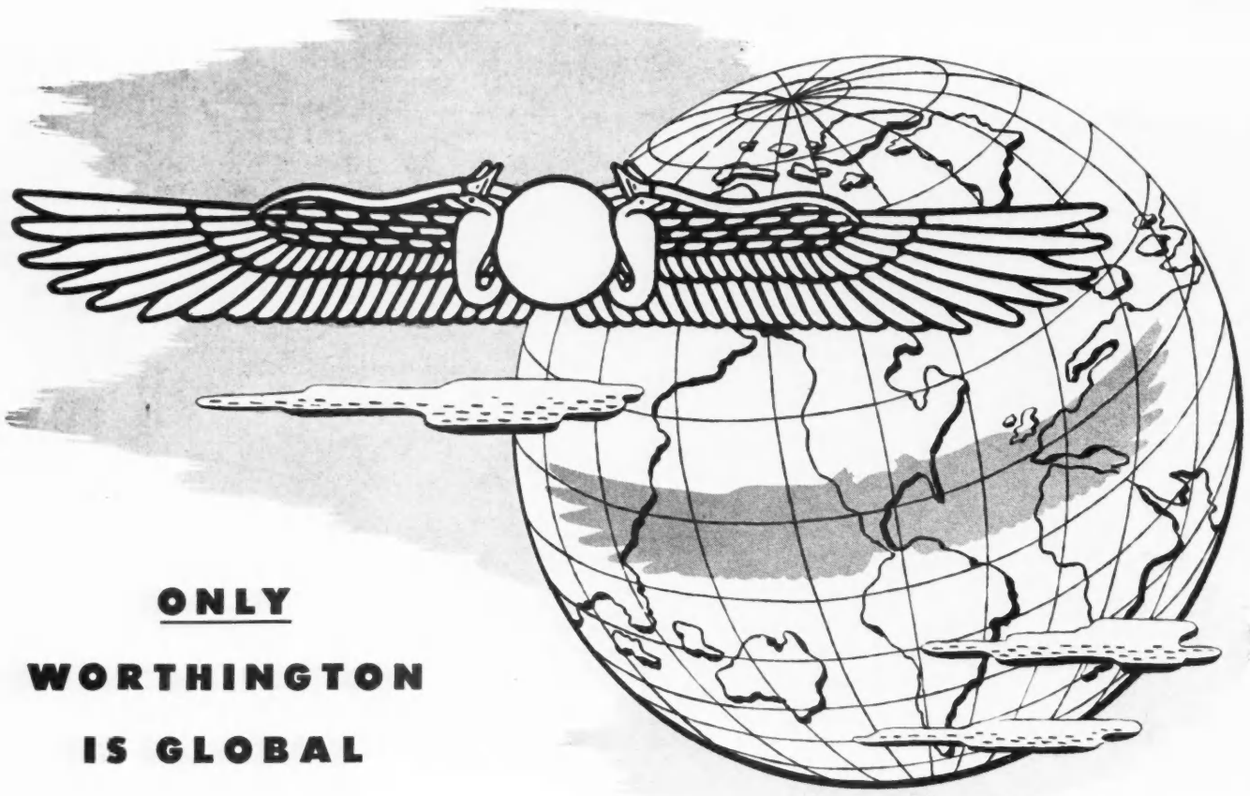
MANUFACTURERS OF: T.I.W. Portable rigs . . . T.I.W. Safety Joints . . . T.I.W Rotary and Casing Slips . . . T.I.W. Grief Stem Safety Valves . . . T.I.W. Packers for every purpose . . . and many other oil field tools.

GENERAL OFFICE and MAIN PLANT: 1401-1423 Maury Street, Houston 10, Texas.
Other Shops at Victoria and Corpus Christi.

EXPORT REPRESENTATIVE: Val R. Wittich, 30 Rockefeller Plaza, New York, N. Y.

CANADA—Southern Alberta Fields





ONLY

WORTHINGTON

IS GLOBAL

In Complete Sales and Service Facilities

Worthington supplies more compression and refrigeration equipment to the petroleum industry — throughout the world — than all other manufacturers combined! . . . Here's a fact that speaks volumes, not only for product-excellence, but for the many added advantages of a world-wide sales and service organization. Only Worthington brings such an organization — complete and co-ordinated — to every area where oil is produced or processed.

Moreover, the international character of this far-flung network cuts through a host of import regulations. Worthington's huge factories in England, France, Italy and Spain supply many foreign oil lands where trade restrictions bar the entry of American-built machines. And wherever Worthington equipment goes, you are sure to find Worthington service.

This service is the outgrowth of more than a century's experience producing liquid-and-gas-handling equipment. It is backed by a technical staff skilled in research and development, and by the greatest productive capacity in the field. It covers a broad diversity of products vital to the petroleum industry, ranging from pipeline pumps, compressors and valves to turbines, condensers, Diesel and gasoline engines and other power plant essentials.

All of these products are offered in models specifically designed or adapted to the special requirements of the oil industry — assuring the best possible solution to the problems presented by each individual application.

That's one of the many reasons why *there's more worth in Worthington*. Oil men everywhere are invited to make full use of Worthington facilities. *Worthington Pump and Machinery Corp., Export Division, Harrison, N.J., U.S.A. Offices and representatives throughout the world.*

F7-1

WORTHINGTON

Pumps • Compressors • Engines • Turbo-Generators
Construction Equipment • Refrigeration

THE SIGN OF VALUE AROUND THE WORLD

CANADA—Continued

At the end of the year an estimated 75,000 acres had been proved for gas production.

The emergence of Leduc as a major field has prompted Imperial to construct a refinery at Edmonton for the processing of 6500 barrels daily. The refinery was purchased from the U. S. Government and moved from Whitehorse in the Yukon, to Edmonton. It has also prompted Canada's greatest single pipe line project, a 550-mile line to link Leduc and other Central Alberta areas with the refining centers at Moosejaw and Regina in Saskatchewan, with a possibility that it may even be extended to Winnepeg. It is scheduled for completion by the end of 1949.

Other pipe line projects include a possible system of the Northwest Natural Gas Company from the southwestern Alberta gas fields to Portland, Seattle and Vancouver. It is to include some 850 miles of 24-inch pipe, and about 500 miles of 6 to 20-inch. Applications are on file with Canadian and American authorities for approval. A system has been discussed to link the Calgary area with Winnepeg by a gas line to be constructed by Western Prairie Pipe Line Company.

Engineering and Geological Data on Western Canada Fields

PROVINCE and FIELD	Est. Proved Area (Acres)	Gravity of Oil (API)	PRODUCING FORMATION						
			Local Name	Kind	Geologic Age	Depth of Wells (Ft.) Minimum Top Pay	Depth of Wells (Ft.) Maximum Depth Wells	Average Thickness of Pay (Feet)	Type Structure
Alberta:									
Armelgra	.....	18	Ellis	Sand	Jurassic	3100	....	..	Unknown
Athabaska	25,000	Gas	Labiche	Sand	Cretaceous	600	1300	..	Strat-Trap
Bantry	.....	24.7	Bantry	Sand	Cretaceous	3253	3270	..	Unknown
Barnwell	5,000	Gas	Bow Island	Sand	Cretaceous	2150	....	10	Monocline
Bow Island	10,000	Gas	Bow Island	Sand	Cretaceous	1900	2255	9	Dome
Brooks	2,500	Gas	Milk River	Sand	Cretaceous	1190	1250	100	Strat-Trap
Conrad	1,000	26	Ellis	Sand	Jurassic	2960	3125	13	Strat-Trap
Del Bonita	200	36–38	Madison	Lime	Miss.	5054	....	12	Anticline
Dina	400	14–15	Meridian	Sand	Cretaceous	1680	1900	15	Strat-Trap
Fabyan	200	Gas	Viking	Sand	Cretaceous	1585	1900	10	Strat-Trap
Foremost	5,000	Gas	Bow Island	Sand	Cretaceous	2050	2250	9	Anticline
Keho	.....	32	Bow Island	Sand	Cretaceous	3680	....	5	Anticline
Kinsella-Viking	250,000	Gas	Viking	Sand	Cretaceous	2100	2200	10	Strat-Trap
Hay Lake	100	30	Madison	Lime	Miss.	3094	....	4	Dome
Jumping Pound	.....	46	Madison	Lime	Miss.	9900	....	300	Anticline
Leduc	8,500	39	Devonian	Lime	Devonian	5000	5425	60	Antilcine
Lloydminster-Lone Rock-Blackfoot	20,000	14–18	Skarky	Sand	Cretaceous	1750	2000	10	Strat-Trap
Medicine Hat	40,000		Medicine Hat	Sand	Cretaceous	900	1.50	20	Strat-Trap
Moose Dome	200	47.7	Fairholme	Lime	Devonian	1534	....	..	Dome
Pakowki-Pinhorn	25,000	Gas	Bow Island	Sand	Cretaceous	2000	2200	..	Strat-Trap
Pincher Creek	.....	51	Madison	Lime	Miss.	11,700	11,927	100	Anticline
Princess	200	34.5	Devonian	Lime	Devonian	3980	4000	18	Dome
	200	26–28	Sanburst	Sand	Cretaceous	3177	....	35	Strat-Trap
	200	26	Madison	Lime	Miss.	3300	3320	5	Strat-Trap
Red Coulee	150	31.5	Vanalta	Sand	Cretaceous	2417	2475	30	Terrace
Skiff	.....		Ellis	Sand	Jurassic	3054	3080	..	Unknown
South Princess	500	26–28	Madison	Lime	Miss.	3271	3326	20	Dome
Suffield	2,000		Medicine Hat	Sand	Cretaceous	980	1130	40	Strat-Trap
Taber	760	17–23	Taber	Sand	Cretaceous	3028	3260	23	Strat-Trap
Tilley	.....	27	Sunburst	Sand	Cretaceous	3170	....	10	Strat-Trap
Turner Valley	25,000	37–64	Madison	Lime	Miss.	3400	9600	450	Anticline
Twin River	.....	36.6	Madison	Lime	Miss.	3913	3964	..	Anticline
Vermilion	1,000	14	Vermilion	Sand	Cretaceous	1870	1980	5	Strat-Trap
Wainwright	12,000	22	Wainwright	Sand	Cretaceous	2200	2300	10	Anticline

Engineering and Geological Information on Eastern Canada Fields

PROVINCE AND TOWNSHIP	Proved Area (Acres)	Range of Gravity Oil (A.P.I.)	PRODUCING FORMATION			DEPTH (Ft.) Minimum to Top of Pay (Ft.)	DEPTH (Ft.) Maximum to Bottom of Pay (Ft.)	Type of Structure
			Name	Kind	Age			
New Brunswick:								
Stony Creek	1,625	36.6	Albert	Sand	Miss.	1500	3200	Anticline-Monocline
Ontario:								
Bothwell	400	36	Onondaga	Lime	Devonian	395	410	Anticline
Brant		Gas	Medina-Cataract	Lime-Sand	Silurian	360	532	Monocline
Dawn	600	40	Onondaga	Lime	Devonian	320	370	Dome
	600	36	Guelph-Salina	Lime	Silurian	1600	1800	Dome
Declute	600	Gas	Guelph-Salina	Lime	Silurian			Anticline
Dover West	900	36	Trenton	Lime	Ordivician	2950	3300	Fault
Dunwich	500	Gas	Onondaga	Lime	Devonian	3300	400	Dome
Elgin		Gas	Clinton	Lime	Silurian	1250	1400	Monocline
Essex	2,000	40	Guelph-Salina	Lime	Silurian	900	1100	Anticline
Haldimand-Norfolk	145,000	Gas	Medina-Cataract	Sand-Lime	Silurian	350	900	Monocline
	18,900	Gas	Clinton	Lime	Silurian	870	1200	Lens
Kent	15,000	Gas	Guelph-Salina	Lime	Silurian	1200	1400	Dome
Lincoln	5,400	Gas	Medina-Cataract	Sand-Lime	Silurian	315	500	Monocline
Middlesex	200	Gas	Grimsby	Lime	Silurian	1450	1500	Monocline
Moore	500	Gas	Salina	Lime	Silurian	2150	2200	
Mosa	4,000	Gas	Widder	Lime	Devonian	275	425	Dome
Oil Springs	750	38	Onondaga	Lime	Devonian	370	400	Dome
Onondaga	1,920	39	Medina-Cataract	Sand	Silurian	480	650	Monocline
Petrolia	8,000	36	Onondaga	Lime	Devonian	470	510	Anticline
Somkra Township	1,000	Gas and Oil	Salina	Lime	Silurian	1825	1900	
Tilbury	3,000	Gas	Guelph-Salina	Lime	Silurian	1050	1400	Antilcine
Tuamsville	300	Gas	Onondaga	Lime	Devonian	370	380	Anticline
Welland	38,000	Gas	Medina	Lime	Silurian	400	910	Monocline
Wentworth	6,000		Clinton	Lime	Silurian	300	440	Monocline

Stronger SIDE BARS

Careful boxing assures clean chain. Easy-to-read labels facilitate handling and storage.

Here's Why:

1 BLANKED AND BURRED

2 OFFSET HYDRAULICALLY

3 PUNCHED

4 RESTRUCK FOR UNIFORMITY

5 SHAVED OR REPUNCHED

6 HEAT TREATED

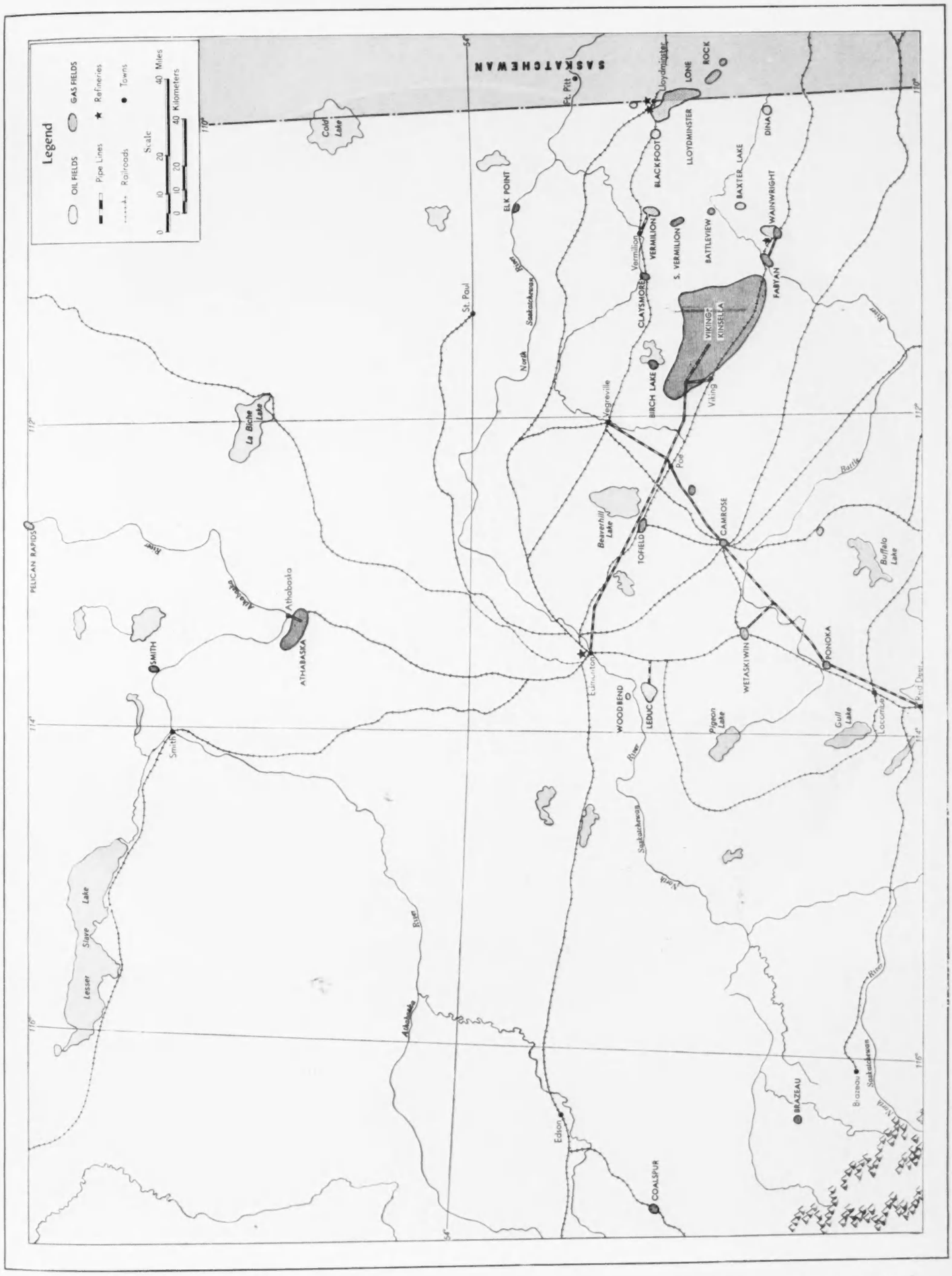
JEFFREY

ESTABLISHED 1877

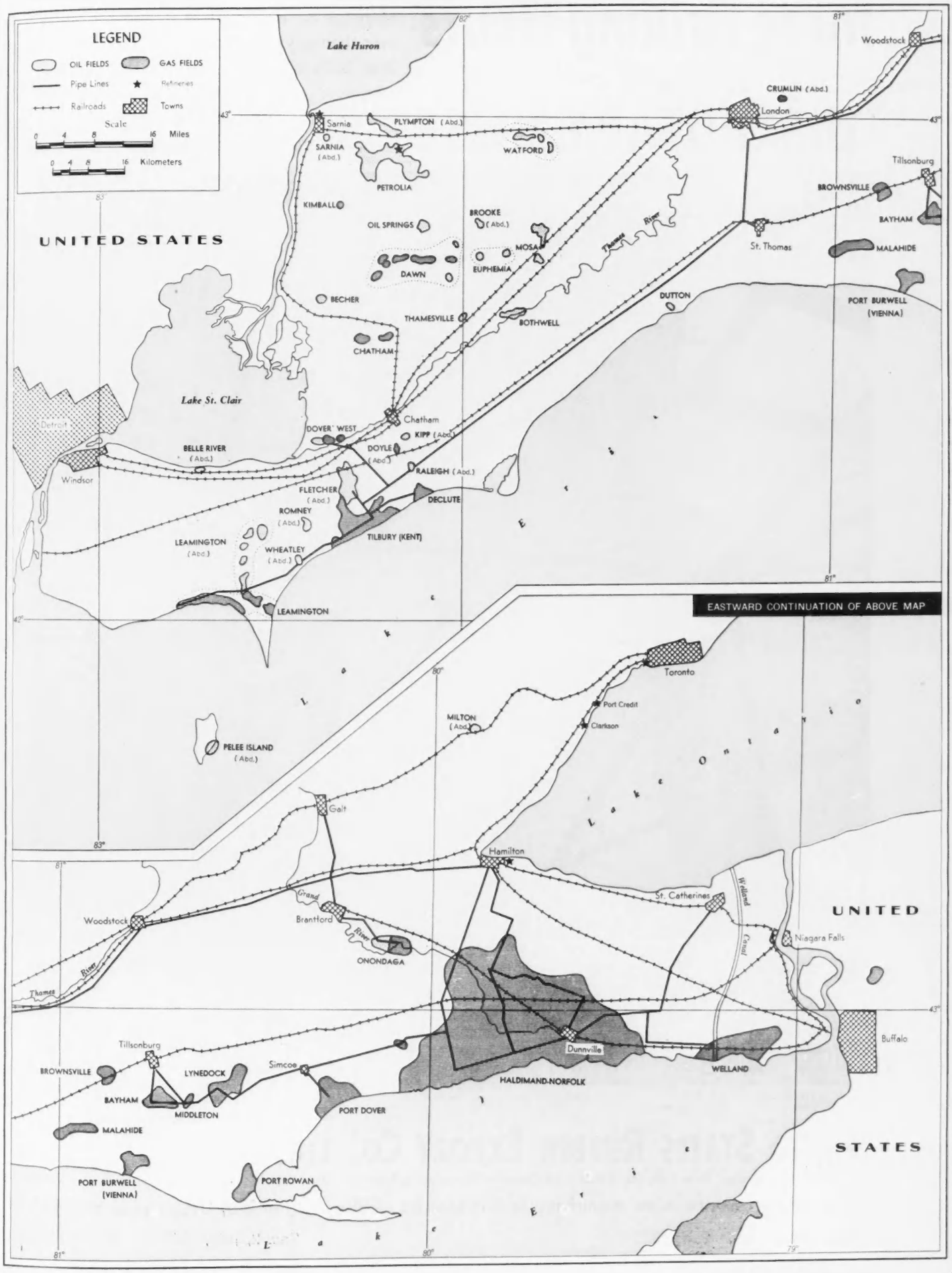
JM

THE JEFFREY MANUFACTURING COMPANY, 98 5-99 North Fourth Street, Columbus 16, Ohio

CANADA—Central Alberta Fields

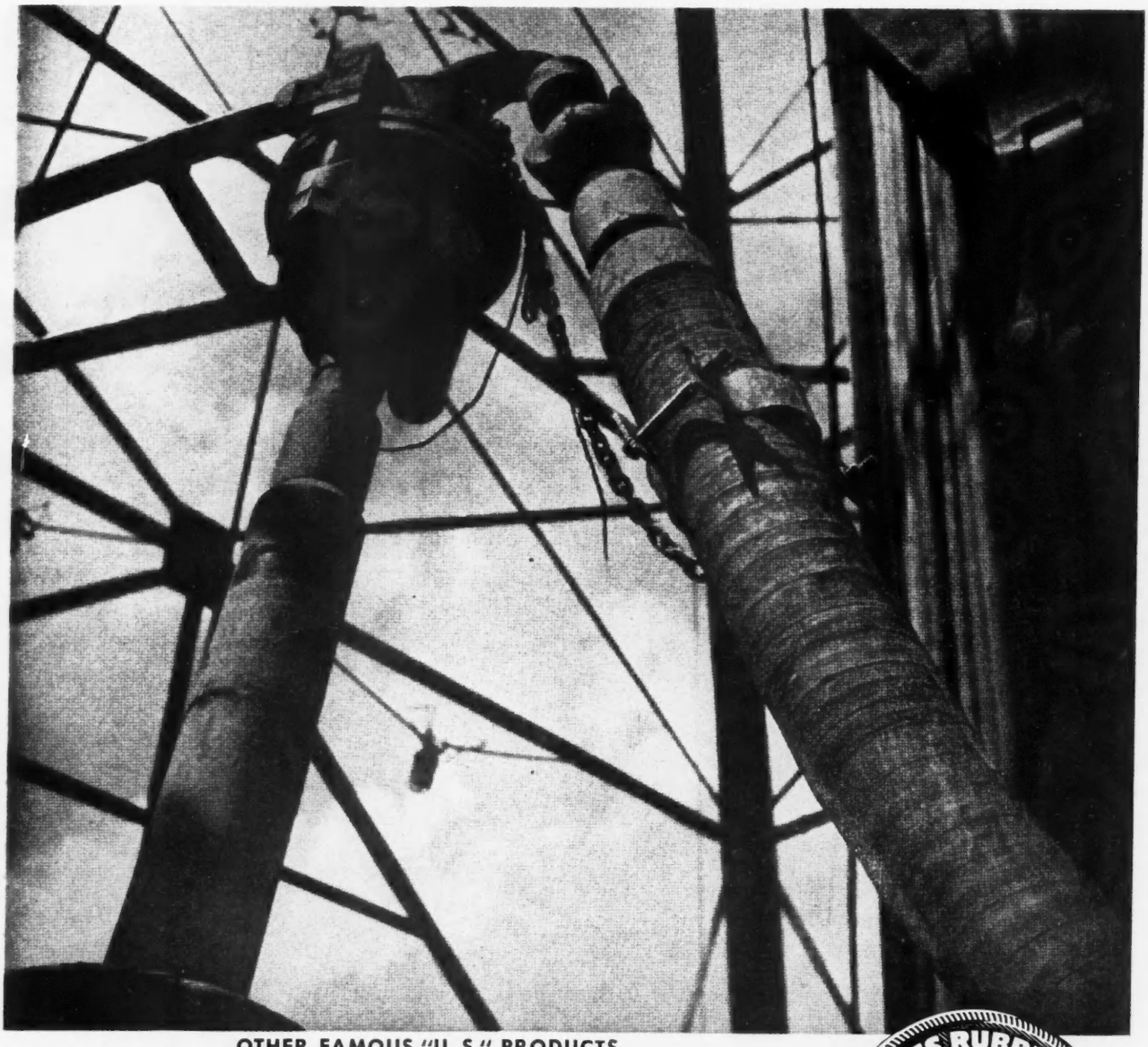


CANADA—Ontario Fields

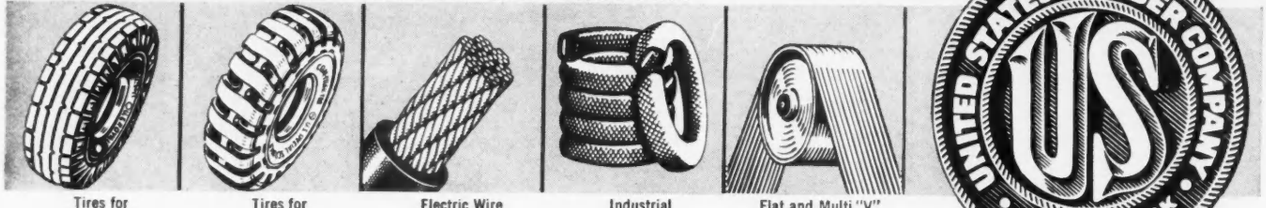


More Drilling Hours with "U. S." ROTARY HOSE

More "U. S." Rotary Hose is used the world over than any other make. From the streamlined built-in coupling, through the specially reinforced ends and back into the strong, flexible body — this hose is scientifically designed to provide safe, extra service.



OTHER FAMOUS "U. S." PRODUCTS



Tires for trucks | Tires for off-the-road service | Electric Wire and Cable | Industrial Packing | Flat and Multi "V" Transmission Belting

UNITED STATES RUBBER COMPANY · US · TRADE MARK

UNITED STATES RUBBER EXPORT CO., Ltd.

Rockefeller Center, New York 20, U.S.A. In Canada: Dominion Rubber Co., Ltd.

SERVING THROUGH SCIENCE

"U. S." products are also manufactured in Mexico, Cuba, Argentina, Uruguay and Brazil

CANADA—Continued

Natural Gas Pipe Lines of Eastern Canada

COMPANY	Origin	Terminus	Length (Miles)	Diameter (Inches)	Year Completed
New Brunswick:					
Moncton Electricity and Gas Co.	Stony Creek	Moncton	8	10	1912
Ontario:					
Dominion Natural Gas Co.	Tilbury	Hamilton	175	12, 10, 8	1912
	Tilbury	Kingsville	30	8	1912
	Haldimand	Hamilton	(2) 50	10	1910
				8	1906
Union Gas Co. (Canada)	Haldimand	Hamilton	50	8	1936
	Dawn	London	60	10	1935
	Tilbury	Windsor	50	(2) 10	1906
					1908
	Tilbury	Sarnia	55	10	1910

Wildcats Completed in Eastern Canada in 1947

PROVINCE	Company, Well, Location	Date Completed	Total Depth (Feet)	Results Formation
Nova Scotia:	Sun Oil Co., Ltd. Sunoco No. 1		11,504	Dry—Bottomed in Horton sandstones and shales.
	Little Narrows Petroleum Co., Ltd.	1 -22	327	Abandoned
		7 - 8	1,614	Dry—Bottomed in Horton conglomerate
Ontario:	Imperial Oil Co., Ltd.—12 mi n of Becher field	8 -13	2,299	Show of oil—435M. R.P. 860—Silurian
		9 -22	2,195	1,070 M. R.P. 860
		11-27	2,385	100 M. R.P. 725
		6 -13	2,480	Dry—show of 4 bbls. per day
		11-15	2,340	Dry—Horizon brown lime.

Wildcats Completed in Alberta in 1947

Area Company and Well	Location	Date Completed	Total Depth	Results
Aldersyde				
Royalite Oil Co.'s De Winton 2	13 of 24, 21-1W.5th, 10 mi. s of Calgary and 16 mi. e of n Turner Valley field.	11-4	10401	Abandoned
Bow Island				
Cal.-St. Juno Prov. 54-18	6 of 18, 10-12W.4th, 6 mi. sw Bow Island gas field	12-7	3195	Abandoned
Brooks				
Cal.-St. Brooks Prov. 88-28	13 of 28, 19-14W.4th, 5 mi. ne of town of Brooks.	7-13	4850	Abandoned
Cal. Imperial Bantry 11-2	1 of 2, 18-13W.4th, between Brooks and Tilley, 10 mi. sw of S. Princess Madison lime field.	12-24	4824	Oil Discovery
Crowfoot 1	14 of 33, 20-19W.4th, Blackfoot Indian Reserve near Bassano.	6-14	4466	Susp. some gas
Camrose				
Anglo-Home C & E 1	9 of 29, 46-20W.4th, 1½ mi. sw of town of Camrose and 42 mi. se of Leduc field.	10-13	5241	Abandoned
Dina				
Cal.-St. Edgerton Prov. 64-24	6 of 24, 45-4W.4th	6-21	2514	Suspended
Husky McLaughlin 16-34	16 of 34, 47-2W.4th, 10 mi. sw of Lone Rock oil area.	7- 1	2322	Abandoned
Imperial Greenglade 1	5 of 16, 41-1W.4th	11- 1	3274	Abandoned
Duvernay				
St. Paul Gas Syn. 1	10 of 4, 58-9W.4th, ½ mi. se of town of St. Paul.	10-19	1578	Gas well
Edmonton				
Can.-Gulf Stony Pl. 1	14 of 9, 52-26W.4th	11-21	6568	Abandoned
Imperial Looma 1	4 of 10, 50-23W.4th, 18 mi. e of Leduc field.	8-12	6500	Abandoned.
Foremost				
McColl Fr.-Union 16B-22	10 of 22, 1-7W.4th, 8 mi. e of Pinhorn gas area.	11-11	2511	Abandoned
7C-27	7 of 27, 2-10W.4th, in Smith Coulee area.	10- 1	1863	Abandoned
16B-30	16 of 30, 2-10W.4th, 3 mi sw of Smith Coulee gas discovery.	10-21	1989	Abandoned
7C-31	7 of 31, 3-6W.4th, midway between Pakowki and Manyberries.	8-12	2290	Abandoned
7C-3	7 of 3, 3-10w.4th, 10 mi. sw of Pakowki gas field.	8- 4	2001	Gas well
6-23	6 of 23, 4-4w.4th, 10 mi se of Manyberries gas field.	11- 3	3000	Abandoned
11A-21	11 of 21, 4-5W.4th, Manyberries.	8-27	2763	Abandoned
11A-29	11 of 29, 4-5W.4th, S. manyberries Area.	11-28	2850	Probable Gas Well
10B-25	10 of 25, 4-6W.4th, Manyberries Area.	9-10	2720	Abandoned
10D-9	10 of 9, 4-9W.4th.	2-21	2237	Gas well—in Bow Isld. sd.
6D-25	6 of 25, 4-10W.4th, between Foremost and Pakowki gas field.	1-22	2244	Gas Well–Bow Isld. sd.
7-13	7 of 13, 5-6W.4th, Pakowki Area.	6-26	2703	Gas well
6D-27	6 of 27, 5-6W.4th, outpost 3 mi. nw of Manyberries gas discovery.	8-24	2540	Abandoned
6D-23	6 of 23, 6-5w.4th, Manyberries Area.	11-26	3250	Abandoned
13-5	13 of 5, 6-7w.4th.	7-15	3508	Abandoned
10D-23	10 of 23, 6-10w.4th.	4- 8	2407	Abandoned
10D-22	10 of 22, 7-9W.4th.	3- 2	3495	Abandoned
Hanna				
Berry Creek Petroleums 1	3 of 9, 31-14W.4th, at town of Hanna.	3-12	4289	Gas well. Devonian dolomite
Jumping Pound				
Shell 5-71	5 of 7, 25-4W.4th. Deep test.	9-27	14443	Gas and cond.
Leduc				
Homestead Yaremko 1	7 of 19, 50-25W.4th, 2½ mi. of Leduc	9- 5	5365	Abandoned
Imperial Leduc 1	5 of 22, 50-26W.4th.	2- 3	5066	Oil Discovery 36.7 A. P. I gravity from Devonian
New Ranchmen Comm. 1	11 of 7, 49-24W.4th, 12½ mi. se of Leduc.	9-22	5550	Abandoned
Lloydminster				
Husky & Cont. Earlie 1-11-36	NW 11 of 36, 48-3W.4th, about 14 mi se of town of Lloydminster.	11-19	2202	Abandoned
Husky & Cont. Earlie 1-9-28	NW 9 of 28, 49-3W.4th, 5 mi. n of Earlie post office, 15 e and 2 s of Lloydminster	12- 1	2166	Suspended
Husky Paradise 1-11-11	NW 11 of 11, 48-2W 4th, 9 mi. se of Lloydminster producing area.	10- 5	2452	Suspended
Husky S. Kitscoty 1-3-14	SW 3 of 14, 50-3W.4th, 2½ mi. s of Kitscoty, 5 mi. w of the Blackfoot section of Lloydminster	10-10	1923	Suspended
Husky N. Kitscoty 1-4-18	SW 4 of 18, 51-2W.4th, 4 mi. ne of Kitscoty and 7 mi. ne of Blackfoot Area	9-12	1924	Suspended
Morinville				
Imperial Legal 1	8 of 18, 58-24W.4th, 30 mi n of Edmonton.	12-26	6500	Abandoned
Imperial Morinville 1	9 of 30, 56-24W.4th, 22 mi. due n of City of Edmonton.	8-11	5078	Abandoned in Devonian
Princess				
Princess CPR 64-11 (Cal.-St.)	6 of 11, 19-12W.4th, 3 mi. se of the Empire Pacific Madison oil wells.	6-11	3490	Abandoned
Princess CPR 14-22A (Cal.-St.)	8 of 22, 20-12W.4th.	8-29	5444	Abandoned
Princess Brooks Syn. CPR 3	3 of 36, 18-12W.4th.	8-16	3545	Abandoned
Taber				
Taber Jenson 28-8B (Cal.-St.)	4 of 8, 9-16W.4th, about 2 mi se of Stds. East Taber oil pool	11- 7	3250	Abandoned
Taber Prov. 27-15A (Cal.-St.)	16 of 15, 9-17w.4th, extension.	10-24	3200	Oil
Taber Prov. 6B-15A (Cal.-St.)	6 of 15, 9-17W.4th, extension.	3-30	3229	Oil
Turner Valley				
Royalite 86	12 of 3, 21-3W.5th, east of Turner Valley.	4- 9	10145	Abandoned in Madison lime
Vermilion				
Homestead Baxter L. 1	2 of 6, 47-5W.4th.	6-27	2376	Abandoned
Husky Vanesti 1-5-10	5 of 10, 48-4W.4th, 19 mi. sw Islay Interpreted area.	9-12	2326	Suspended
Husky Islay 1-11-29	11 of 29, 50-4W.4th, 3 mi. s of Islay, 6 mi. e of Vermilion oil field.	9-30	1988	Abandoned
Wabamun				
Imperial Paddle R. 1	5 of 17, 56-8W.5th, 6 mi s of railway from Edmonton to Whitecourt.	6-11	8746	Abandoned
Wetaskiwin				
McColl Fr.-Union 4-11	4 of 11, 45-25W.4th, near Wetaskiwin.	3- 1	6500	Abandoned in Devonian
McColl Fr. 3-22 (East Wet.)	3 of 22, 46-23W.4th, 5 mi. e of Wetaskiwin.	7-31	5368	Abandoned
McColl Fr. 1-20 (Bigstone Cr.)	1 of 20, 46-26 W.4th, 24 mi. s of Leduc discovery.	8-28	6218	Abandoned
McColl Fr. 14-14 (Wizard L.)	14 of 14, 48-27W.4th, 16 mi. s and 5 mi w of Imp. Leduc discovery.	8-30	6231	Abandoned
Millet Leduc 16-6	16 of 6, 48-24W.4th, 17 mi. se of Leduc oil field.	10-23	6255	Abandoned
Total	57 Wells.		283,279	

for modern

oil well operation

THE

WORLD OVER

. . . you'll need

RATIGAN "SURE-GRIP" TOOLS

RATIGAN PRODUCTS ARE SOLD THROUGH LEADING SUPPLY STORES

OIL-LESS BEAM HANGERS AND ROD HANGERS • POLISH ROD GRIPS AND CLAMPS • SPRING SUCKER ROD HOOKS • SUCKER ROD ELEVATORS • TUBING ELEVATORS • SPRING SWIVEL LINKS • "C" LINKS • OIL-LESS BEAM ROCKERS AND STIRRUP BEARINGS • STUFFING BOXES • PARAFFINE SCRAPERS • TUBING TONGS • MACARONI TONGS • ROD WRENCHES AND COUPLING WRENCHES • TUBING BLOCK CLAMPS • BELL NIPPLES • SHOCK ABSORBERS • STRINGING-UP LINKS • ADJUSTABLE SUCKER ROD LINE WEIGHTS • COMBINATION ROD WIPER • HORSE HEADS • BLOWOUT PREVENTERS

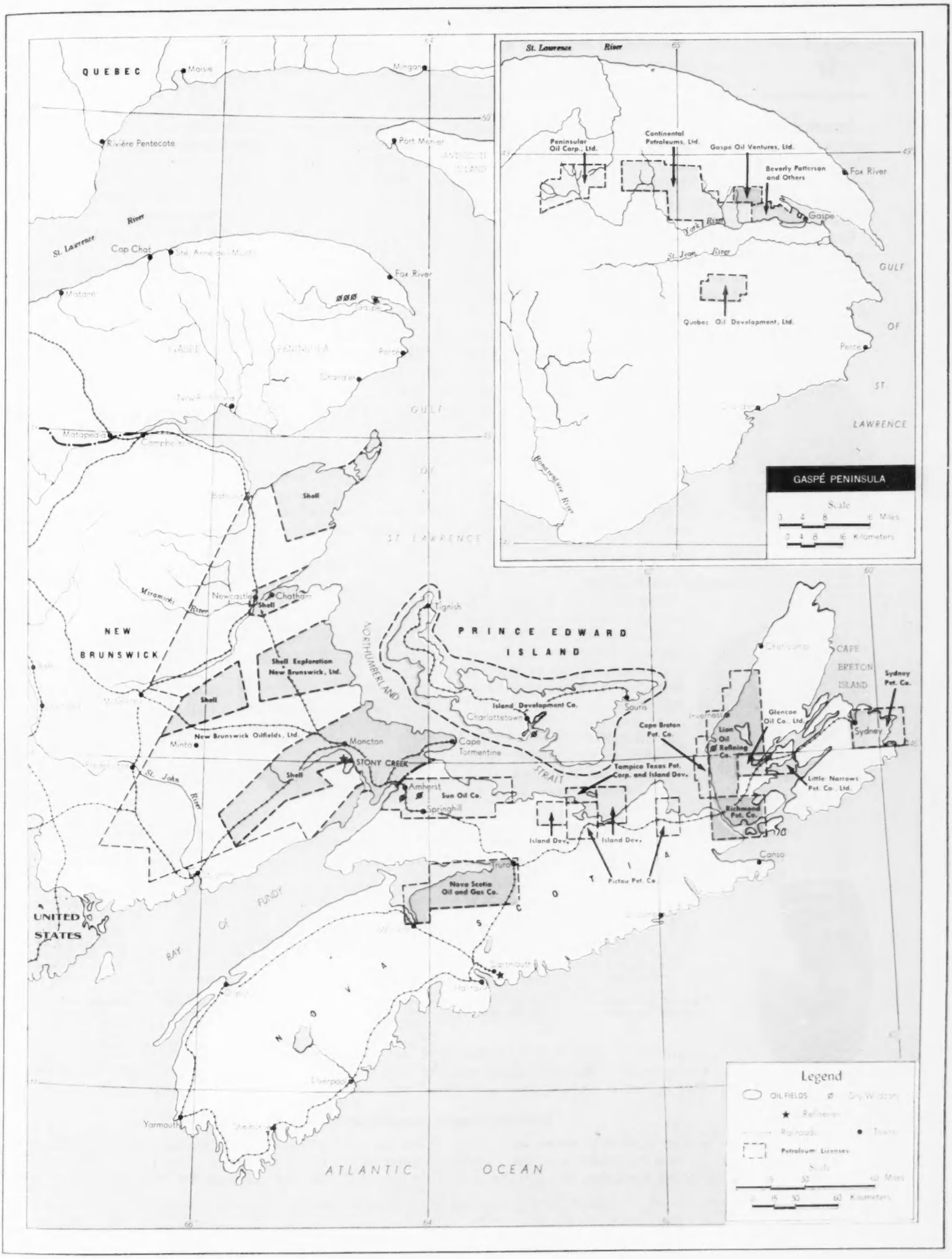
Ratigan "Sure-Grip" Tools keep pace with today's oil well pumping operations. Designed and engineered to give maximum operating efficiency at minimum operating and maintenance costs; and to withstand the most rugged service with absolute safety.

Ratigan products are known the world over and are recognized as leaders in their particular class. Complete information on all products is given in the latest edition of the Composite Catalog. For individual catalog write us direct.

J. P. RATIGAN INC.

1213 Santa Fe Avenue **Los Angeles 21, California**

CANADA—Maritime Provinces Concessions



AMERICAN ROLLER BEARING CO.

416-420 Melwood Avenue, Pittsburgh 13, Pennsylvania

Pacific Coast Office: 1718 S. Flower St., Los Angeles, Calif.

American Roller Bearings are specialized heavy-duty bearings ideally suited for oil-industry service. They are built specifically to withstand the most severe loads in deep drilling, and when properly selected, will outlast the equipment in which they are installed.

Easy Installation. The simplicity of Americans makes installation easy. No special designs are necessary; no adjusting shims; no threaded housing closures. Housing bores are straight and require minimum diameters.

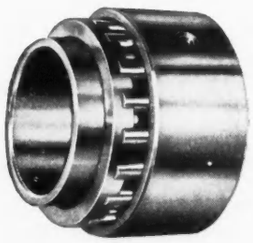
No Adjustment. Incorrect installation is impossible with Americans, and once installed, no further adjustment is necessary.

Steel. High carbon, high chrome electric furnace steel is used in the manufacturing of bearing races and rollers. Constant tests and inspection assure steel that will have uniform distribution of strength and great wear-resistance.

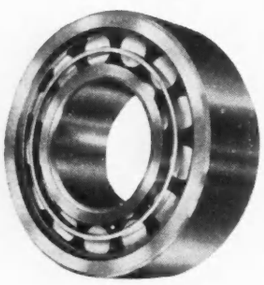
Minimum Friction. The straight-line construction of Americans reduces power-loss to an absolute minimum and superior steel and precision design make this advantage lasting.

AMERICAN ROLLER BEARINGS—MEDIUM HEAVY DUTY · HEAVY DUTY · SUPER-HEAVY DUTY

American conventional type roller bearings are all characterized by the same simplicity of design, special high quality bearing steel and precision manufacturing. They are made, however, in medium-heavy, heavy, and super-heavy duty types differing in cross section and weight to make each type exactly suitable for the loads and stresses imposed. Thus, there is an American straight roller type bearing for every condition and application required. American Roller Bearings are now used by more than 30 manufacturers of heavy duty drilling equipment. Available in steel end ring or bronze as desired.

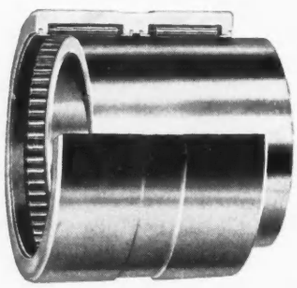


AMERICAN ROLLER BEARINGS STAMPED CAGE TYPE



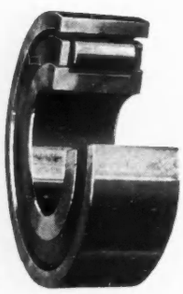
To meet the demands of many manufacturers for a precision bearing of moderate cost, American developed their stamped cage type. This is a straight inner race bearing with a stamped steel cage and snap rings retaining the roller assembly in relation to the outer race. Available in standard sizes or in special sizes to your order.

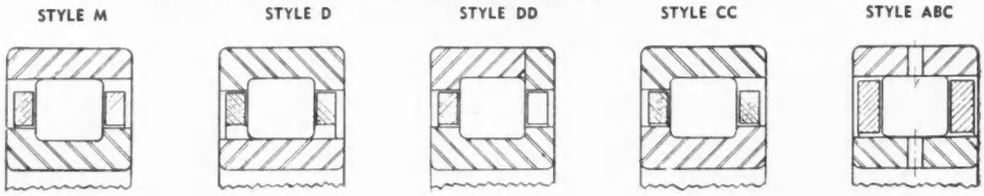
AMERICAN NEEDLE BEARINGS SINGLE AND DOUBLE ROW TYPES



American Needle Bearing are manufactured in single row and double row styles in accord with AFBMA standards. In addition, American Needle Bearings can be furnished to special dimensions and with special clearances.

AMERICAN RADIAL ROLLER BEARINGS





Grooved inner race—straight outer race.

Grooved outer race—straight inner race.

Grooved inner race—one lipped outer race with plate forming second lip.

Grooved inner and one lipped outer race.

Straight inner and outer races.

American Radial Roller Bearings are engineered to exacting standards that result in better performance and minimum maintenance. Made with bronze cages. Furnished in 5 styles, 6 S.A.E. series. Special designs also available.

SPECIFICATION BEARINGS

In addition to the standard types and sizes, American Roller Bearings are custom made to your specifications and engineered to meet special requirements when necessary. Our engineering department and plant facilities are always available for this purpose. Let us be your bearing "specialists."

CANADA—Continued

In Eastern Canada there have been no developments of outstanding importance, with Sun Oil Company failing to find production near Amherst, Nova Scotia, after drilling to 11,504 feet. Shell Exploration, New Brunswick, Ltd., carried out geological work in the Sussex area of New Brunswick which resulted in plans for wildcatting to start during 1948. Drilling continues without appreciable success on the interesting prospects of the Gaspe Peninsula of Quebec.

Gas production from southwestern Ontario fields increased nearly 700 million cubic feet in 1947 to a total of 7,738,484,000 cubic feet for the year.

Data on Refineries in Eastern Canada

COMPANY	Location of Plant	Crude Charging Capacity, (Bbls. Daily)	Cracking Capacity, (Bbls. Daily)	Type of Refinery	Operating Status
New Brunswick:					
New Brunswich Oilfields, Ltd.	Weldon	250		Skimming	Operating
Nova Scotia:					
Imperial Oil, Ltd.	Imperoyal (2 mi. south of Dartmouth)	34,000	11,600	S-C-A	Operating
Ontario:					
British-American Oil Co., Ltd.	Clarkson (Toronto)	8,250	4,500	Complete	Operating
	Toronto	6,000	3,000	Skim-Crk	Operating
Burlington Refineries, Ltd.	Hamilton	600		Skimming	Shut Down
Canadian Oil Companies, Ltd.	Petrolia	3,500	1,500	S-C-L-W	Operating
Good Rich Refining Co., Ltd.	Port Credit (Toronto)	4,000	1,300	Skim-Crk	Operating
Imperial Oil, Ltd.	Sarnia	41,500	20,000	Complete	Operating
McColl-Frontenac Oil Co., Ltd.	Toronto	13,000	3,300	Skim-Crk	Operating
Quebec:					
British-American Oil Co., Ltd.	Montreal	17,000	7,500	S-C-A	Operating
General Petroleum Refineries	Pointe-aux-Trembles (Montreal)	300		Skimming	Shut Down
Imperial Oil, Ltd.	Montreal	25,000	9,800	S-C-L-A	Operating
McColl-Frontenac Oil Co., Ltd.	Montreal	20,000	12,500	Skim-Crk	Operating
Shell Oil Co. of Canada, Ltd.	Montreal	10,000	7,500	Skim-Crk	Operating
Total	14 plants	183,400	82,500		

Data on Refineries in Western Canada

COMPANY	Location of Plant	Crude Charging Capacity, (Bbls. Daily)	Cracking Capacity, (Bbls. Daily)	Type of Refinery	Operating Status
Alberta:					
British-American Oil Co., Ltd.	Calgary	5,500	2,500	S-C-A-	Operating
Excelsior Ref., Ltd.	Lloydminster	1,000		Skimming	Operating
Gold Standard Oils, Ltd.	Wainwright	300		Skimming	Operating
Imperial Oil, Ltd.	Calgary	8,300	4,000	S-C-A	Operating
Imperial Oil	Edmonton	6,500	.....	Complete	Building*
Pacific O&R of Alberta	Lethbridge	2,000	.....	Skimming	Shut Down
Turner Valley Gas & Oil Refineries, Ltd.	Hartwell (Turner Valley)	2,200	1,000	Skim-Crk	Operating
British Columbia:					
Home Oil Distributors, Ltd.	N. Vancouver	2,000	.....	Skimming	Shut Down
Imperial Oils, Ltd.	Ioco (Vancouver)	16,000	2,600	Complete	Operating
Shell Oil Co. of B. C.	Shelburn (Vancouver)	4,200	.....	Skimming	Operating
Standard Oil Co. of B. C.	Burnaby (Vancouver)	4,700	.....	Skim-Asphalt	Operating
District of Mackenzie:					
Northwest Co., Ltd.	Norman Wells	850	.....	Skimming	Enlarging
Manitoba:					
Anglo-Canadian Oils, Ltd.	Brandon	2,000	1,000	Skim-Crk	Operating
North Star Oil, Ltd.	St. Bonaface	2,000	750	S-C-A	Operating
Radio Oil Refining, Ltd.	Winnipeg	500	.....	Skimming	Operating
Trump Oil Co., Ltd.	Morris	250	.....	Skimming	Operating
Saskatchewan:					
British-American Oil Co., Ltd.	Moose Jaw	5,200	2,500	S-C-A	Operating
Consumers Co-op. Refin.	Regina	1,500	500	Skim-Crk	Operating
HiWay Refineries, Ltd.	Moose Jaw	300	.....	Skimming	Operating
HiWay Refineries, Ltd.	Rosetown	275	.....	Skimming	Operating
HiWay Refineries, Ltd.	Saskatoon	300	.....	Skimming	Operating
Husky Refining Co.	Lloydminster	2,500	.....	Asphalt	Operating
Imperial Oil, Ltd.	Regina	10,500	6,500	S-C-A	Operating
Northern Petroleum Corp.	Kamsack	200	.....	Skimming	Operating
Sterling Refineries, Ltd.	Yorkton	750	.....	Skimming	Shut Down
Total Western Canada	25 Plants	79,825	21,350		

* This complete refinery moved from Whitehorse.

Crude Oil Pipelines of Western Canada

COMPANY	Origin	Terminus	Length (Miles)	Diameter (Inches)	Year Completed	Status
Imperial Oil, Ltd.	Leduc field	Nisku	8	8	1947	In use
Imperial Oil, Ltd.	Leduc field	Moose Jaw and Regina	500	10	.....	Planned
Valley Pipeline Company	Turner Valley	Calgary	30	4	1925	In use
Valley Pipeline Company	Turner Valley	Calgary	30	4	1937	In use
Valley Pipeline Company	Turner Valley	Calgary	31	6	1938	In use
Valley Pipeline Company	Turner Valley	(Gathering lines)	105	2, 3, 4	1945	In use
Standard Development Company	Conrad field	Conrad	5½	4	1945	In use
Standard Development Company	Princess field	Princess	3½	3	1945	In use

Natural Gas Pipelines of Western Canada

COMPANY	Origin	Terminus	Length (Miles)	Diameter (Inches)	Year Completed	Status
Canadian Western Natural Gas, Light, Heat & Power Company	Turner Valley	Calgary	28	10	1922	In use
Canadian Western Natural Gas, Light, Heat & Power Company	Turner Valley	De Winton	16	14	1922	In use
Canadian Western Natural Gas, Light, Heat & Power Company	Turner Valley	Okotoks	15	6	1922	In use
Canadian Western Natural Gas, Light, Heat & Power Company	Foremost	Bow Island	29.5	10	1912	In use
Canadian Western Natural Gas, Light, Heat & Power Company	Bow Island	Calgary	169.5	16	1912	In use
Canadian Western Natural Gas, Light, Heat & Power Company—(Branches on Bow Island, Calgary system, served from Turner Valley		Lethbridge	4.1	8	1912	In use
		MacLeod	16.6	6	1915	In use
		Granum	5.5	6	1915	In use
		Claresholm	9.9	6	1920	In use
		Stavely	3.3	3	1915	In use
		Nanton	1.4	4	1915	In use
Northwestern Utilities, Ltd.	Viking	Edmonton	77.2	12¾ (Double)	1923	In use
Northwestern Utilities, Ltd.	Kinsella	Viking	10	10 & 12	1940	In use
Northwestern Utilities, Ltd., (Branch on Viking-Edmonton system)		Vegreville	20	4	1930	In use
		Ponoka	70	8	1946	In use
	Ponoka	Red Deer	30	6	1946	In use
Franco Utilities, Ltd.	Vermilion field	Vermilion	5	4	1943	In use
Wainwright Gas Company	Fabyan	Wainwright	7½	4	1927	In use

FROST GEOPHYSICAL CORPORATION

C. H. Frost, President — Joseph A. Sharpe, Vice-President

EXPLORATION FOR OIL AND MINERALS

Surface, air and marine magnetometer surveys

Gravity surveys

Electrical surveys

INTERPRETATION

Geologic interpretation of the results of magnetic, electrical, gravity and seismic surveys

GEOPHYSICAL INSTRUMENTS

Saturated reactor magnetometers, gravity meters, electrical prospecting instruments

4410 South Peoria — Box 58 — Tulsa, Oklahoma

MEXICO

MEXICO, faced with increasing internal demand for petroleum products, the desirability of taking advantage of current favorable exported oil prices to get more dollars, and to ease the strain of an unfavorable trade balance, intends that 1948 will be a year of greatly intensified activity, both in processing and producing crude oil. In order that Mexico's needs can be satisfied, its government-controlled oil industry now has planned new refining facilities, new oil and gas pipe lines, repressuring projects in old producing fields, and an exploration and exploitation program that will attempt to uncover the oil reserves that in a dangerously few years will be absolutely necessary to supply even its own petroleum requirements.

During 1948, detailed exploration will be made in Northeastern Mexico, along the Gulf Coast of the states of Tamaulipas, Veracruz and Tabasco, particularly in the Veracruz Basin which extends from Jalapa on the north to the Isthmus Saline Basin on the south. Employing both geological and geophysical methods in these surveys will be 39 parties, nine more than were used in 1947. About 69 locations on possible new structures are expected during the year as a result of these surveys.

Petroleos Mexicanos (Pemex) officials are gravely concerned over meeting the rising oil demand within Mexico. Failure to discover new reserves in any appreciable quantities led to the decision late in 1947 to embark on an all-out exploratory campaign which would include drilling about 75 wildcat wells a year with the help of American equipment and personnel and at a cost of about $17 million per year.

Of the exploratory wells proposed for the near future, Pemex expects to drill 23 of them with its own equipment, four in Northeastern Mexico, 10 in the Tampico embayment and nine in the Isthmus. In addition, contracts are to be let for 30 other exploratory ventures, 20 in Northeastern Mexico and 10 in the Tampico embayment.

In the existing producing fields, 17 wells will be drilled in Poza Rica field, four in Northeastern Mexico's gas fields, 10 in the Panuco field, and 16 in the Isthmus.

For the first time since the expropriation of American and British oil properties in 1938, Mexico, in the latter part of 1947, showed signs of being interested in attracting foreign capital into its petroleum program. This was indicated by a contract between the Mexican government and J. Edward Jones of the United States calling for the latter to drill 100 tests on locations already selected by American geologist E. DeGolyer, who had been retained by Pemex on a consulting basis. In addition to the contract wells, Jones was to fully develop any new fields that he may discover. The total cost of this contracted program would be about $20 million and reimbursement to be made through government bonds, which were designed to be attractive enough for resale in the U. S. Another deal along the same lines is reported pending with Cities Service Company.

Early in 1948 the heads of Pemex handed to the U. S. Ambassador a document setting out the terms under which re-entry of American companies would be permitted. The terms were quite restrictive, Pemex designating the areas to be explored, reserving the right to supervise operations and

Oil Production and Producing Wells in Mexico

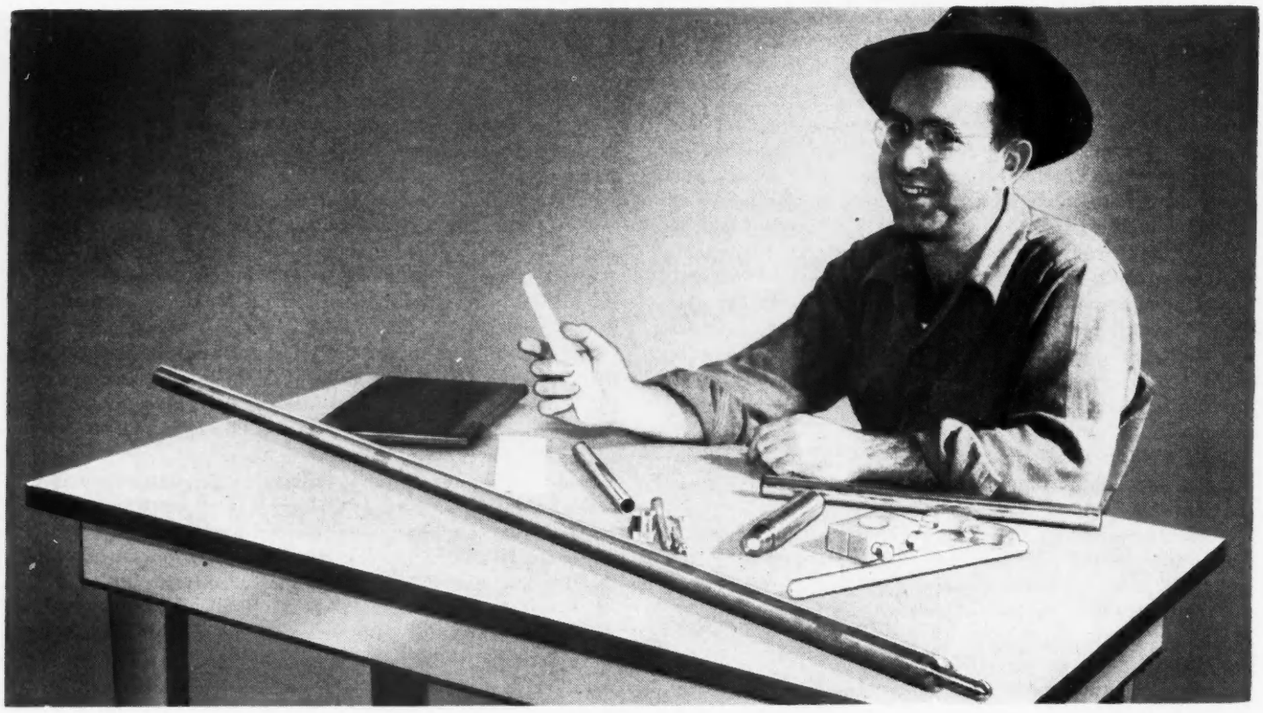
District	Company	Year of Discovery	OIL WELLS AT END OF 1947			CRUDE OIL PRODUCTION (Barrels)			
			Shut In	Producing	Total	Daily at End of 1947	Year 1946	Year 1947	Cumulative Through 1947
Isthmus	Petróleos Mexicanos	1921	80	205	285	16,210	5,825,074	6,368,896	147,357,959
Northern	Petróleos Mexicanos, Mexican Gulf Oil, Miscellaneous	1901	152	511	663	26,700	8,623,909	10,028,235	791,135,905
Poza Rica	Petróleos Mexicanos	1930	15	64	79	89,456	26,141,066	31,718,942	293,520,385
Southern	Petróleos Mexicanos, Mexican Gulf Oil, Miscellaneous	1908	51	197	248	21,006	8,479,997	7,801,322	1,081,387,748
Total Mexico			298	977	1,275	153,372	49,070,046	55,917,395	2,313,401,997

Engineering and Geological Data on Mexico Fields

Field and State	Proved Area (Acres)	Range of Gravity of Oil (API)	PRODUCING FORMATION						
			Name	Kind	Age	Depth of Wells (Feet) Minimum Top Pay	Depth of Wells (Feet) Maximum Total Depth	Average Thickness Pay (Ft.)	Type Structure
NORTHEASTERN MEXICO:									
La Presa, **Tamaulipas**		gas	Mt. Selman	Sand	Eocene	1925	3160	38	Anticline
Mier, **Tamaulipas**		gas	Mt. Selman	Sand	Eocene	2120	2345		Nose
Mision, **Tamaulipas**		dist.	Vicksburg	Sand	Lwr. Olig.		6040		Anticline
Rancherias, **Tamaulipas**	1230	gas	Fayette Yegua Cook Mt.	Sand	Eocene	264	2440	310	Anticline
TAMPICO AREA:									
Poza Rica, **Vera Cruz**	15,850	30	Tamabra	Lime	Lwr. Cre.	7250	7546	296	Nose
Northern District, **Ver.-Tamps.** (Ebano, Panuco, etc.)	100,000	12	Tamaulipas	Lime fractures	Lwr. Cre.	1148	1968	*	Faulted Ant.
Southern District, **Vera Cruz** (Golden Lane)	33,000	20	El Abra	Lime reef	Lwr. Cre.	2200	2202	†	Faulted Ant.
Soledad, **Vera Cruz**		40	Tamabra	Lime	Lwr. Cre.	6435	6480	10	Nose
ISTHMUS OF TEHUANTEPEC:									
Cuichapa, **Vera Cruz**	300	30	Concepcion Inferior	Sand	Miocene	2100	2133	33	Faulted dome
El Burro, **Vera Cruz**	370	26	Concep. Inf.; Encanto	Sands	Miocene	2460	2620	62	Salt dome
El Plan, Lignitic Zone, **Vera Cruz**	830	24	Cedral, Lignitic	Sands	Miocene	1970	2440	216	Faulted Ant.
El Plan, Concepcion, **Vera Cruz**	250	30	Concep. Inf.; Sup.	Sands	Miocene	5734	5865	131	Dome
El Plan, East Extension, **Vera Cruz**	80	35	Concep. Inf.; Encanto	Sands	Miocene	3883	4110	32	Faulted nose
Filisola, **Vera Cruz**	460	22	Encanto	Sand	Miocene	1585	1980	92	Fltd. terrace
Nuevo Teapa, **Vera Cruz**	40	36	Encanto	Sand	Miocene	429	711	29	Salt dome
Tonala, **Vera Cruz**	470	28	Concep. Inf.: Encanto Deposito	Sands Sand	Miocene Oligocene	1640	2130	167	Salt dome

* Prod. from fractures in first 800 feet of Tamaulipas and San Felipe lines.

† Wells go into reef-phase limestone only about 2 feet



ELI Announces Improved B. H. P. Gauge

GREATER ACCURACY, MORE RUGGEDNESS BUILT INTO ELI-MANUFACTURED HUMBLE-TYPE SUBSURFACE PRESSURE GAUGE

Greater accuracy of records because of reduced friction has been attained by ELI engineers in developing the new "O" ring packing in the stuffing box, through which the pressure piston travels to the drum chart, on the improved bottom-hole pressure gauge. By chromium-plating this piston, friction has been further reduced and longer wear assured. Accuracy proved and guaranteed for this instrument is one quarter of one percent.

A new clock is available that will stand more abuse, delivers more power and has less internal friction. Its performance promises to set new standards for this type of instrument.

A new clock oil has been developed which is stable to 300° F. and eliminates the necessity of re-oiling the clock in the field. The oil assures longer life of the clock, since forgetfulness in lubrication no longer affects its operation, and excessive oiling is prevented.

Uniform and accurate readings over long periods are now possible due to the especially-treated helical spring, which acts against pressure on the piston. Hysteresis has been reduced to give excellent repeatability. This spring is pre-loaded against reaction of the piston to atmospheric changes, so the base-line remains constant in atmospheric ranges. Pressures are recorded only in the bore-hole, when under pressure exceeding the initial tension.

A new separator section prevents well fluids from entering to working parts; thereby lengthening its useful life, and improving accuracy.

All the above improvements are now available in a new case with "O" ring joint seals which assures even more safety from entry of well fluids. This new joint is more rugged and has withstood pressure up to 13,500 P.S.I. without leakage.

The ELI bottom-hole pressure gauge is manufactured with extreme care, and engineered to withstand the usual abuse liable to be encountered in the field. The great number of gauges in use testifies to the fact that the instrument renders superior service.

The working principle is simple: Well pressures enter ports at the top of the gauge, reacts against a piston which is held back by a helical spring. On the end of the piston rod is fastened the stylus which records the vertical movement of the piston on a revolving drum chart. The drum chart is driven by a clock mechanism. The ELI Bottom Hole Pressure Gauge is 1¼ inches in diameter, and 66 inches long, weighing 17 pounds. It is run in the well through a suitable stuffing box and lubricator on either .066 or .072 inch standard wire line.

OTHER ELI TEST AND LABORATORY EQUIPMENT

Humble-Type Subsurface Thermometer
Accuracy to ½ of 1°; pressures to 10,000 lbs.; ranges 60° to 240° F. (special order only), 1¼ in. x 62 in.

Calibrating Bath
For calibrating B.H.P. gauges and ELI recording thermometers at operating temperatures.

Dead Weight Tester
For calibrating B.H.P. gauge in 5000 and 10,000 lb. ranges. Accuracy to 1/10 of 1% of pressure under test.

Field Transfer Bottles
660cc and 1000cc, stainless steel, pressures up to 10,000 lbs.

Field Transfer Pump

Bottom-Hole Samplers
Humble-Types A and B, Perco type, and Wofford type.

ELI Mercury Pump
Positive displacement, pressures up to 10,000 lbs.

Heise-Bourdon Tube Gauges
All sizes and ranges, dial sizes up to 16 inches.

Pressure-Volume Cell
Stainless steel, approx. 635cc, pressures up to 10,000 lbs. mounted on trunnions, base 9-in. x 12-in., height 14-in., weight 40 lbs.

Pressure Viscosimeter
Humble design, non-corrosive materials, accurate measure of samples for viscosity under reservoir conditions.

Gas-Oil Ratio Equipment
Determines gas liberated from oil under various conditions—flash and differential ratios may be determined.

Water-Bath Assembly
18-in. x 16-in. x 17-in. insulated tank equipped with 3000W Chromolox heater.

Water Determination Apparatus
100 W Chromolox heater element, stainless steel or brass tubes as specified, 10 extraction cups.

Hayward Permeameter
Permeance of core is read directly, and permeability determined by a single multiplication with length-area ratio. Self-contained and portable, simple to operate.

Engineering Laboratories, Inc.

TULSA 3, OKLAHOMA **GARLAND, TEXAS**

EXPORT MANAGER
E. F. Gahan, Inc.
500 5th Ave.
New York, N. Y.

REPRESENTATIVES
in Argentina, Brazil, Chile, Paraguay, Peru and Uruguay.
Geotecnica, S. A. Ind. y Com.
Charcas 1775, Buenos Aires, Argentina

FOR LITERATURE WRITE
Dept. WA-48, 624 E. 4th, Tulsa, Okla.

MEXICO—Continued

approve budgets, and requiring that all capital, skills and facilities be furnished by the foreign companies who must bear all losses incurred in the ventures.

The document also specified that upon discovery of oil, expenditures would be returned to the Americans up to 80 percent, from the sale of oil after deduction of operating expenses, after which the companies would receive from 10 to 20 percent of the value of the sale of oil.

All contracts would have to contain a clause specifying that American companies agree not to have recourse to the diplomatic protection or intervention of the U. S. government.

Strong dissatisfaction was expressed by American industry men, but the U. S. State Department regarded the offer as a starting point.

Crude oil production is expected to be boosted to about 62,900,000 barrels in 1948, which will be, if accomplished, the highest for the country since 1927 when output totaled 64,121,000 barrels. This would represent an increase of 12.5 percent over the 1947 total. Not included in the 1948 figure are 915,000 barrels of hydrocarbon liquids expected from the Poza Rica field recovery plant.

In order that the 1948 production schedule can be fulfilled all four of Mexico's major producing districts must furnish their parts of the step-up. However, as in each previous increase, Poza Rica will be called upon to carry the lion's share. Production in the Poza Rica district totaled 31,718,942 barrels in 1947, a daily average of 86,901. In 1948 it will be called upon to give up 96,000 barrels a day, while at the end of 1947 it was making 89,456 daily. Poza Rica, still untried in the sense that it has never been pushed to capacity, has gradually increased from about 57,000 barrels daily in 1944 to current output of about 89,500 barrels a day, and has produced for short periods at a daily rate of 98,000 barrels, but that is considered substantially above its maximum efficient rate and sustained operation at this rate would soon inflict irreparable damage on the reservoir. A plan for returning produced gas to the reservoir is now being pushed and that should safely allow faster withdrawal.

Production in the Northern district of Tampico, which includes the old Panuco heavy crude field, totaled 10,028,235 barrels in 1947 or a daily rate of 27,475 barrels. At the end of the year it was producing 26,700 daily, but the 1948 schedule calls for an increase to 32,600 daily.

The Golden Lane sector of Mexico recorded the only production decline during 1947, dropping from 8,479,997 barrels in 1946 to 7,801,322 in 1947. This area's share of the nation's production for 1948 has been set at 24,200 barrels daily, while it averaged only 21,373 a day in the year just past.

Isthmus of Tehuantepec production amounted to 6,368,896 barrels in 1947 or 17,450 barrels per day. Along with the other districts its 1948 schedule was upped to almost 19,000 barrels a day. At the close of 1947 daily output for this district totaled 16,210 barrels.

Although Mexico is short of U. S. dollars the government is making steady headway with plans to expand and improve its refining and pipe line facilities. Among the most important of these projects is the construction of a new refinery at Salamanca, state of Guanajuato. This refinery will consist of a 30,000-barrel crude distillation unit, gas-oil thermal cracking unit, 30,000-kw generation plant, ethyl-blending equipment and other facilities. Arthur G. McKee & Co., Cleveland, Ohio, has the contract and the cost will be about $12 million. Actual construction will start in 1948, with completion scheduled for 1949. Right-of-way is being surveyed for a 12-inch crude pipe line from Poza Rica to the new plant, a distance of 275 miles. Capacity of this line is to be 30,000 barrels a day.

Another important project is the laying of a large-diameter, 150-mile, gas line from the Poza Rica field to a proposed

Wildcats Completed in Mexico in 1947

State	Company and Well	Date Completed	Total Depth (Feet)	Results
Northeastern District:				
Chihuahua	Pemex, Cuchillo Parado 1	7-23	8480	Dry Hole
Nuevo Leon	China 2	12-18	5817	Dry Hole
Tamaulipas	Trevino 1	4-23	8894	Dry Hole
	Camargo 4	7-1	3596	Gas (MCF pending)
Northern District:				
Vera Cruz	Pemex, Limon 118	2-17	2142	200 b/d oil
	Limon 119	6-9	3185	Dry Hole
	Limon 120	12-27	3131	Dry Hole
Southern District:				
Vera Cruz	Pemex, Soledad 4a	3-25	8375	Dry Hole
	Rcho. Nuevo 2	4-29	6550	Salt Water
	Tlacolula 7	6-3	8317	50 b/d oil
	Tlacolula 8	11-3	8986	Dry Hole
	Tlacolula 9	11-3	8340	Dry Hole
Isthmus of Tehuantepec:				
Tabasco	Pemex, Sarlat 23	3-30	2454	Junked Hole
	Comalcalco 2	8-3	9842	Dry Hole
	Sarlat 24	8-5	3120	Junked Hole*
Vera Cruz	Cabritos 2	5-31	1703	Dry Hole
	Cabritos 3	9-10	3033	Dry Hole
	Acalapa 5	9-30	3937	180 b/d oil

Drilling in Mexico

State and Fields	WELLS COMPLETED IN 1946					WELLS COMPLETED IN 1947					FIELD WELLS DRILLING AND SHUT DOWN AT END OF 1947		
				Total					Total				
	Oil	Gas	Dry	Wells	Footage	Oil	Gas	Dry	Wells	Footage	Drilling	*SD	Total
NORTHEASTERN DISTRICT:													
Camargo, Tamaulipas	....	....	....	....	.....	....	1	1	2	3,616	1	.....	1
Mision, Tamaulipas	....	2	....	2	13,909	....	....	3	3	20,925	.....	1	1
Wildcats, Chihuahua	....	....	....	....	.....	....	....	1	1	8,480	1	.....	1
Wildcats, Nuevo Leon	....	....	1	1	5,265	....	....	1	1	5,817	1	.....	1
Wildcats, Tamaulipas	....	....	....	....	.....	....	1	1	2	12,490	2	.....	2
NORTHERN DISTRICT:													
Chapacao, Vera Cruz	....	....	4	4	7,525	1	....	1	2	4,352	.....	.....	.....
Limon, Vera Cruz	....	....	....	....	.....	1	....	....	1	2,713	1	.....	1
Wildcats, Vera Cruz	....	....	2	2	6,106	1	....	2	3	8,458	.....	.....	.....
SOUTHERN DISTRICT:													
Poza Rica, Vera Cruz	8	....	....	8	59,287	8	....	1	9	66,802	4	6	10
San Miguel Mecatepec, Vera Cruz	4	....	....	4	30,507	....	....	1	1	7,313	1	2	3
Wildcats, Vera Cruz	....	....	6	6	34,532	1	....	4	5	40 568	1	.....	1
ISTHMUS OF TEHUANTEPEC:													
Cuichapa, Vera Cruz	1	....	3	4	8,879	1	....	....	1	2,152	.....	.....	.....
El Plan, Vera Cruz	12	....	3	15	86,474	9	....	3	12	75,637	.....	1	1
Tonala, Vera Cruz	....	....	....	....	.....	....	....	1	1	3,311	1	.....	1
Wildcats, Tabasco	....	....	1	1	5,305	....	....	3	3	15,416	.....	.....	.....
Wildcats, Vera Cruz	....	....	2	2	4,443	1	....	2	3	8,073	.....	.....	.....
Wildcats, (No Location given)	....	....	....	.....	.....	....	....	....	.....	.....	....	2	2
Total	25	2	22	49	262,232	23	2	25	50	286,723	13	12	25

* Majority of shutdown rigs were waiting on equipment, mostly tubular goods

Do you want a gas lift service that gets results ?

CAMCO HAS IT!

for either 5 barrels or 5,000 barrels per day

Do you want a more reliable and more economical installation . . . ?

Do you want an installation that works efficiently throughout the life of the well . . . ?

Do you want a flow valve sufficiently flexible to greatly expand the application of gas lift . . . ?

Do you want a simpler, more flexible, more reliable intermitter . . . ?

IF YOU DO . . . SEE US!

Camco Gas Lift Equipment features all these advantages. Camco Installations have proved to do the job regardless of well depth, bottom hole pressure, productivity index, available gas pressure or number of zones to be produced.

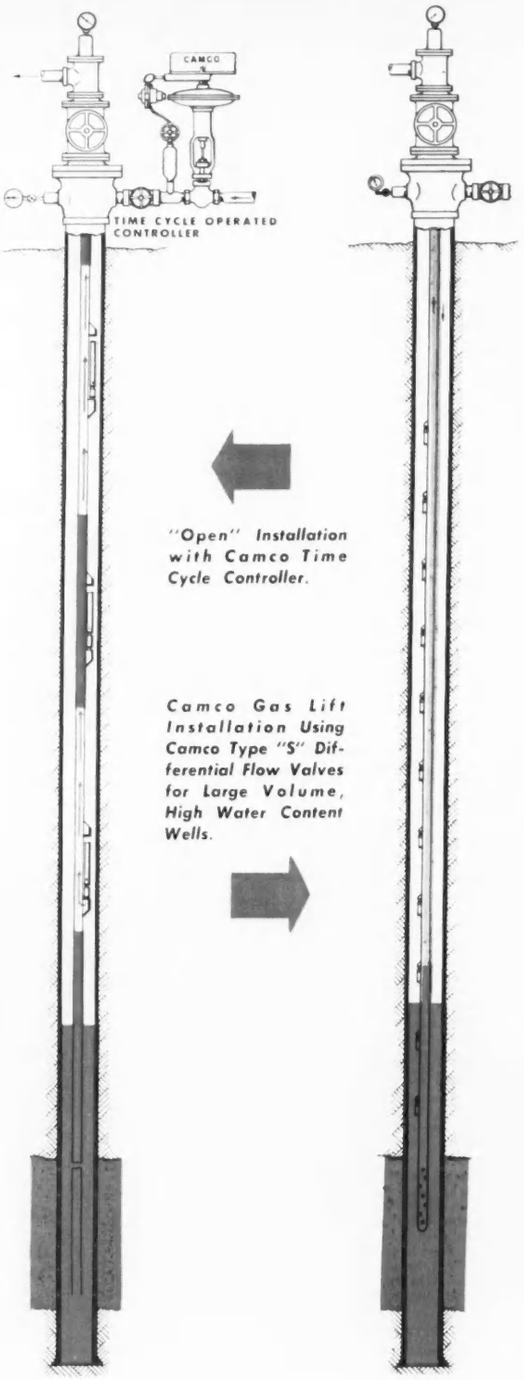
In addition, you get valves that can be easily adjusted or calibrated in the field. You can get valves that operate on either tubing fluid or casing pressure, to lift fluid from even the deepest wells with amazing efficiency. You get a gas lift system that is simple in construction, easy to install and easy to maintain.

Those who have tried the Camco Gas Lift in their own fields have found it to be the best yet. In fact, leading producers everywhere are considering Camco Gas Lift *first* for every lifting problem.

Camco has a complete line of gas lift equipment, with a staff of experienced engineers to help you with your gas lift problems. Consult a Camco representative. He will help you select a gas lift installation especially suited for your field.

CAMCO

GAS LIFT EQUIPMENT AND SERVICE



"Open" Installation with Camco Time Cycle Controller.

Camco Gas Lift Installation Using Camco Type "S" Differential Flow Valves for Large Volume, High Water Content Wells.

CAMCO, INCORPORATED

GENERAL OFFICE
1108 Scanlan Bldg.

HOUSTON, TEXAS
Tel: Preston 5491

BRANCH OFFICES

CORPUS CHRISTI, TEXAS
2713 Savage Lane Tel: 7661

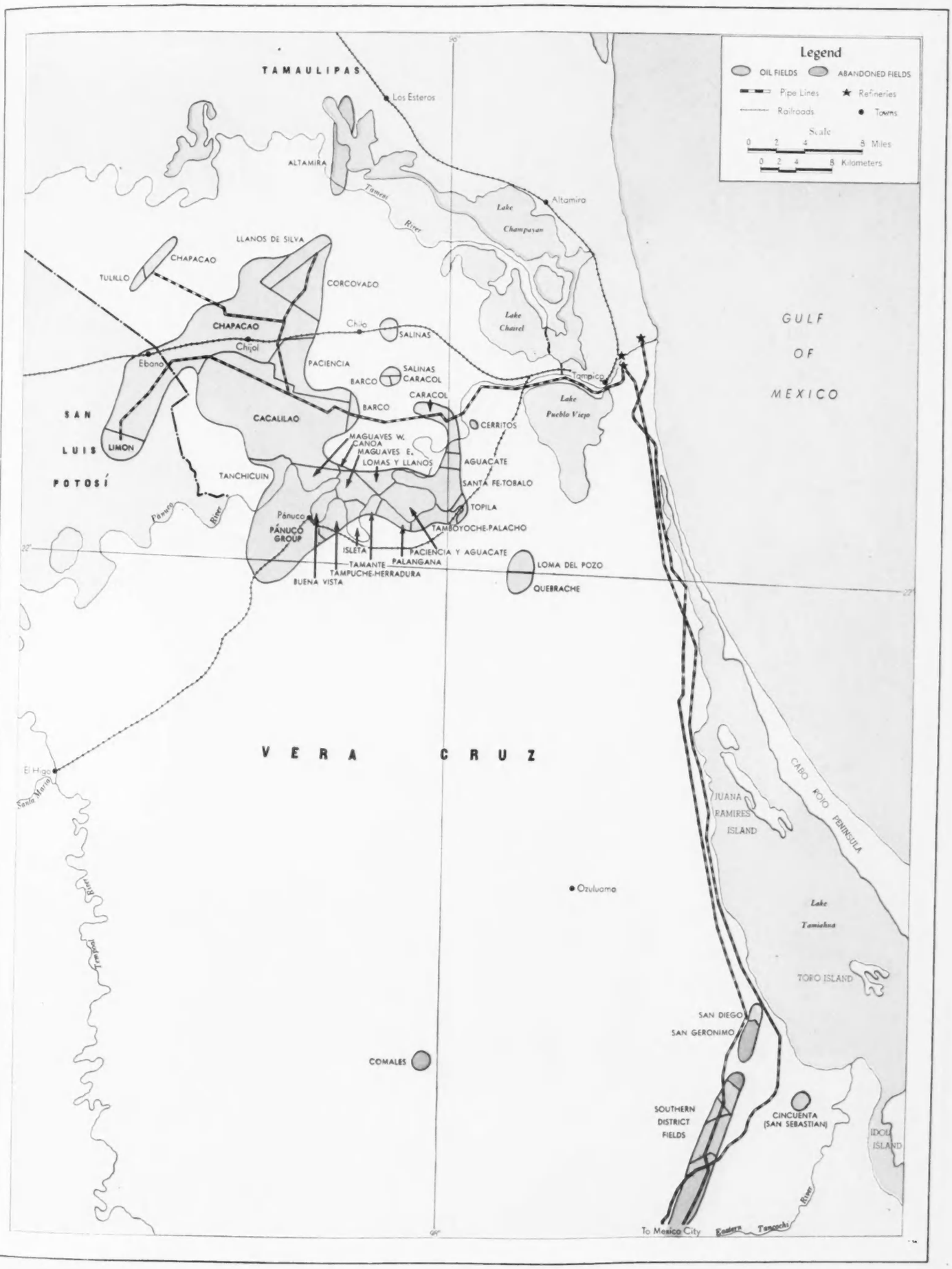
LAFAYETTE, LOUISIANA
224 Adrienne Street Tel: 2507

OPELOUSAS, LOUISIANA
323 South Market Street Tel: P-3173

OKLAHOMA CITY, OKLAHOMA
2430 S. W. 29th Street Tel: 6-3527

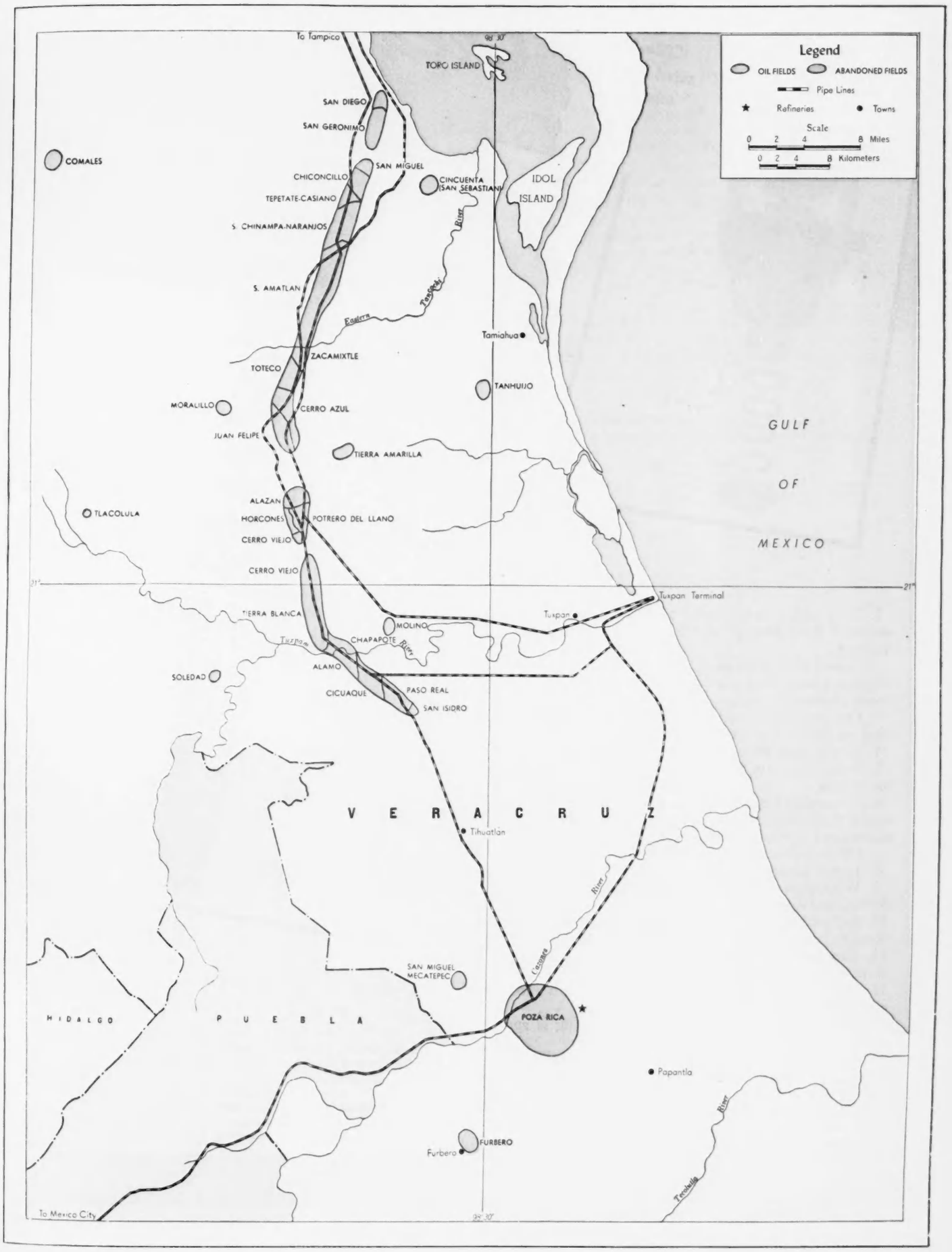
CAMCO SERVICE OF WEST TEXAS
1604 West Texas Street
Tel: 1228 Midland, Texas
Tel: 568 Monahans, Texas

MEXICO—Vera Cruz Pánuco Fields



NOW...
PAT. PEND.
MISSION
Silver Top
SLUSH PUMP VALVE
PAT. PEND.
NEW
MISSION
Super-Service
SLUSH PUMP VALVE

MEXICO—Veracruz Golden Lane Fields



The inside story...shows why drillers prefer

"Oilwell" swivels

1. Long-radius heat-treated cast-steel gooseneck has enlarged fluid passage at the bend to decrease fluid velocity.
2. DI-HARD wash pipe, with very low coefficient of friction, resists fluid cutting action on inside and extends packing-life on outside.
3. One-piece cast-steel housing cap has alemite fitting for grease-lubrication of oil seal.
4. Replaceable shock-absorbing link-rest pads.
5. Large-diameter heat-treated forged-steel bail has safety stop.
6. Streamlined one-piece cast-steel housing, with integral trunnions, is designed so that all bearings are submerged in circulating oilbath.
7. Oil seals have spring-loaded sealing lips.
8. Lower sealing-ring box has alemite grease fitting.
9. Wash-pipe stuffing-box gland, locknut with alemite fittings and dust-shield assembly.
10. Self-sealing wash-pipe packing is grease lubricated through convenient fittings (shown in item 9).
11. Tapered roller bearing in housing cap absorbs upthrust and takes part of radial load.
12. Oil retainer ring insures constant oilbath lubrication of top radial bearing.
13. Heavy-duty full-apex type main bearing is specially designed for this application.
14. Radial bearing, with renewable inner and outer races, placed low in the housing provides maximum steadying effect.
15. Heat-treated forged-steel body with integral tool joint pin.
16. Left-hand A.P.I. tool joint pin is cut directly on the body with ample length for re-threading.

OIL WELL SUPPLY COMPANY

BRANCHES SERVING ALL OIL FIELDS

Executive Office—Dallas, Texas

Domestic Division Offices—Casper, Wyoming · Columbus, Ohio · Dallas, Texas
Houston, Texas · Los Angeles, California · Tulsa, Oklahoma

Export Division Offices—30 Rockefeller Plaza, New York 20, N. Y.
1204 Russ Building, San Francisco 4, California
Dashwood House, 69 Old Broad Street, London E. C. 2, England

Field Representation—San Fernando, Trinidad · Maracaibo, Venezuela
Rio de Janeiro, Brazil · Buenos Aires, Argentina · Lima, Peru

UNITED STATES STEEL

"OILWELL"

addition to the Mexico City refinery that will process natural gas into nitrogenous fertilizers and then make the processed gas available to industrial consumers. Due to soil conditions, pipe lines will not be laid to domestic gas consumers, who will be served by bottled compressed gas. Work on this 20-inch line has been started by Williams Bros. of New York and should be well under way by the end of 1948.

An absorption type natural gasoline plant and crude oil stabilization plant have been installed in the Poza Rica field along with gathering systems to feed the plants. By the time the Mexico City line is completed other facilities for the desulphurization of gas and utilization of the sulphur will have been built. Present plans call for these plants to treat 70 million cubic feet of gas per day, of which the line will take 50 million. The remaining gas will be compressed and returned to the producing reservoir to obtain better field production conditions and ultimate recovery.

A gas line from the new Mision gas field, near Reynosa, is now being built by the Cia. Mexican a de Gas de Monterrey and should be in operation by the middle of 1948. This line is of 12¾-inch pipe, 37 miles long, and with a capacity of 30 million cubic feet of gas daily. It will connect with the existing line that crosses the Rio Grande at San Pedro de Roma and runs to Monterrey.

Additional development contemplated for the future by Pemex includes: lubricants and paraffin plant at the Mexico City refinery; pipe line across the Isthmus and a refinery on the Pacific Coast; cracking plant at Tampico; refinery at Guadalajara with pipe line from Poza Rica; and refineries at Monterrey and Torreon.

In 1948, Mexico's exports are expected to total not less than 15 million barrels of crude and refined products. As in the past, the bulk of this is slated to go to the United States with some to Europe. However, in January, 1948, exports totaled 1,188,540 barrels of which slightly less than half or 581,011 barrels were sent to the U. S. The remaining 51 percent went to Cuba, Dutch West Indies, England, France and Holland. Petroleum shipments in 1947 totaled 14,507,535 barrels, an increase of 54 percent over those of the year before, but slightly less than the 1948 estimate.

During 1947 there were 50 wells completed in Mexico, 18 wildcats and 32 field development wells. Exactly one-half of these were successful, being 23 oil and two gas producers. Of the exploratory wells drilled, three found oil production and one was completed as a gasser. One was a 200-barrel well extending production of Panuco grade crude, another was a 180-barrel producer in the Acalapa area and the third was in the Tlacolula area, 15 miles west of Potrero del Llano in the Golden Lane, and was good for 50 barrels a day. All three of these strikes were in Veracruz, but the latter is not considered a commercial producer. The new gas structure was located in the Camargo area of Tamaulipas.

At the end of 1947 there were 25 drilling operations in Mexico, 18 in fields and 7 in wildcat territory. Thirteen of those operations were actually making hole and twelve were temporarily shut down, waiting for tubular goods in most cases.

Data on Mexico Refineries

District and Company	Location of Plant	Crude Charging Capacity (Barrels Daily)	Cracking Capacity (Barrels Daily)	Type of Refinery	Operating Status
Northern Mexico					
Pemex	Nuevo Laredo	330	None	Skim.	Operating
	Nuevo Laredo	190	None	Skim.	Operating
	Monterrey	160	None	Skim.	Operating
	Cuidad Juarez	1,000	None	Skim.	Operating
Tampico					
Pemex	Ciudad Madero	55,000	8,500	Complete	Operating
	Arbol Grande	20,500	None	S-L-W-A	Operating
	Mata Redonda	11,500	5,500	Skim-Crk.	Operating
	Bella Vista	.....	.....	Skim-Crk.	Dismantled
Poza Rica					
Pemex	Poza Rica	6,400	None	Skim.	Operating
Central Mexico					
Pemex	Atzcapotzalco (Mexico City)	50,000	None	Complete	Operating
	Salamanca	30,000	None	Skim.	Planned
Isthmus					
Pemex	Minatitlan	27,500	2,500	Complete	Operating
Total Operating	10 Plants	172,580	16,500	.....	.....

Pipe Lines of Mexico

COMPANY	Origin	Terminus	Length (Miles)	Number of Lines, Pipe Sizes and Loops	Capacity	Status
CRUDE LINES						
Petroleos Mexicanos	Ebano-Panuco Fields	Tampico	35	Combination 8″ & 10″ with 22 miles of 10″ loop	30,000	In Use
	Ebano-Panuco Fields	Gathering and branch lines to main trunk line	144	4″, 6″, 8″ & 10″		
	Poza Rica	Mexico City	147	One 10″	50,000	In Use
	Poza Rica	Salamanca	287	12″	30,000	Planned
	Poza Rica	Tuxpan	39	One 6″, one 8″ and one 12″ with 12 miles of loop	125,000	In Use
	Tuxpan	Potrero	33	Two 8″	50,000	In Use
	Cobos (Tuxpan)	Alamo	20	One 8″	25,000	In Use
	Alamo	Tampico	103	Combination 8″ & 10″ with 11 miles of loop	24,000	In Use
	Poza Rica	Alamo	35	One 12″	63,000	In Use
	Alamo	Potrero	14	One 8″ & one 10″	75,000	In Use
	Potrero	Chijol (Tampico)	87	Three 8″	72,000	In Use
	Tonala Field	Minatitlan Refy	35	Combination 8″, 10″ & 12″		
	El Plan Field	El Chapo Station	21	Combination 8″, 10 & 12″		
	El Chapo Station	Nanchital	6	One 10″	30,000	In Use
	Cuichapa	El Plan-El Chapo	3	One 8″		
PRODUCTS LINES						
Petroleos Mexicanos	Tonala	Nanchital	23	3″		In Use
NATURAL GAS LINES						
Compania Mexicana de Gas, de Monterrey	Roma	Monterrey	96	12″	50 mil. cu. ft.	In Use
	Mision	Roma-Monterrey	37	12″	30 mil. cu. ft.	Building
Gas Industrial de Monterrey, S.A.	Reynosa	Monterrey	135	14″	50 mil. cu. ft.	In Use
Petroleos Mexicanos	Poza Rica	Mexico City	150	20″	30 mil. cu. ft.	Planned

Geophysical Data

Accurately Correlated with

Subsurface Geology

Plus

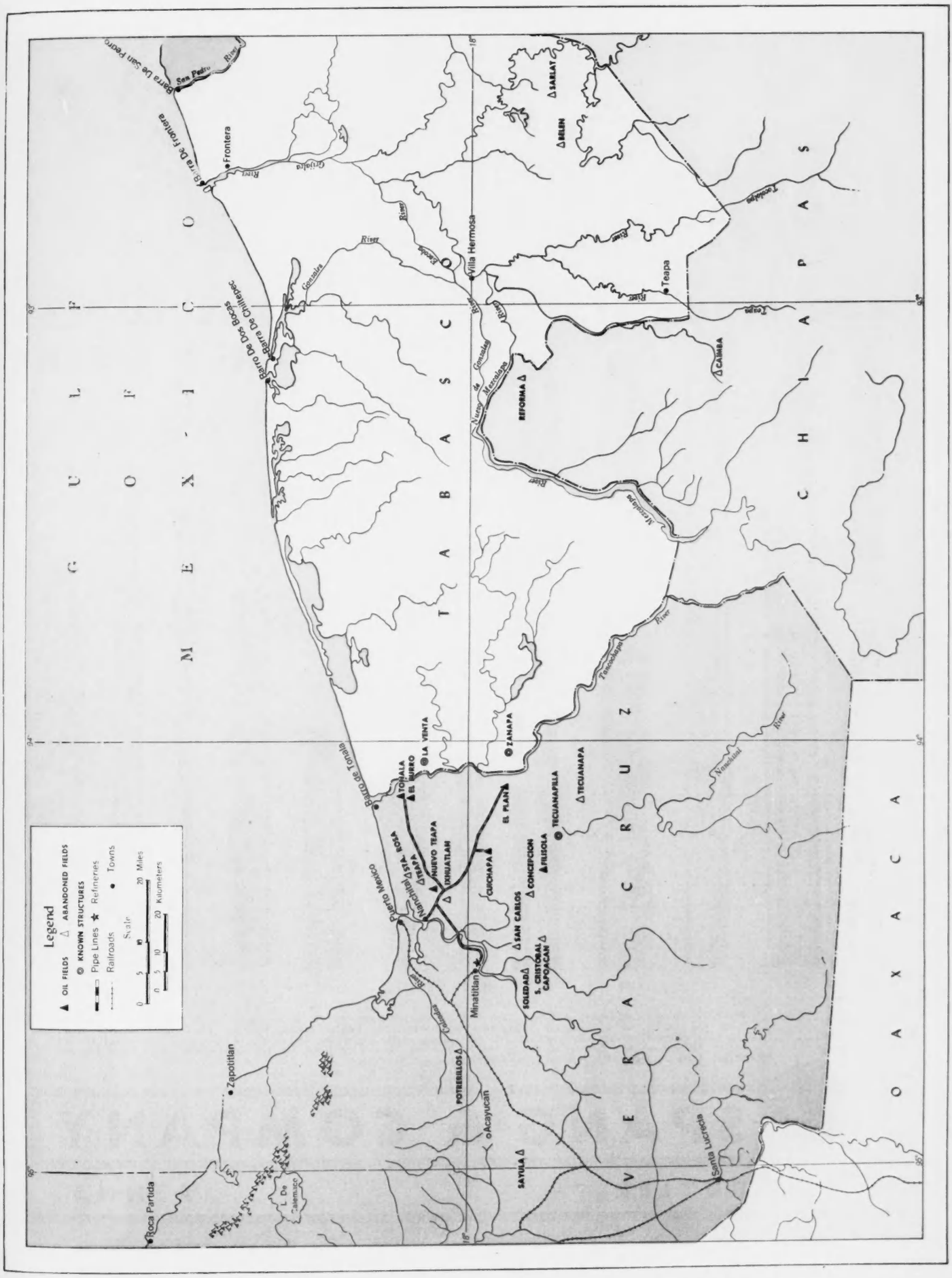
Modern Instrumentation
Capable Personnel
Years of Experience

seismic

EXPLORATIONS INCORPORATED

Gulf Bldg. ESTABLISHED 1932 Houston, Texas

MEXICO—Isthmus Fields



SPANG CABLE TOOLS

FOR MORE EFFICIENT DRILLING TOOLS THE WORLD OVER

In the great oil-producing centers the world over, Spang Cable-System Drilling and Fishing Tools are held in high regard for their "Higher Standards" of efficiency and lasting quality.

Fig. D312—Spang Swivel Rope Socket. Figs. D330, D335—Spang Boxes and Pins. Fig. D360—Spang Straight Drilling Bit. Fig. D322—Spang Weldless Jar. Fig. D328—Spang Drilling Stem. Fig. D368—Spang Twisted Drilling Bit. Fig. D380—Spank Regular Bailer. Fig. F514—Spang Reversible Casing Ripper. Fig. F481—Spang Multi Slip Collar Socket. Fig. F476—Spang Solid Bored Friction Socket. Fig. F460—Spang Center Rope Spear. Fig. F467—Spang Three-Prong Grab. Fig. F482—Spang Full Circle Three Slip Slip Socket. There are many other types of Spang Fishing Tools, not illustrated.

The HIGHER STANDARD

SPANG & COMPANY

BUTLER, PENNA.

UNITED STATES

THE United States, under the spur of constantly mounting domestic demand for every petroleum product, maintained during 1947 a high level of activity and accomplishment. Already it seems likely to become a net importer of crude oil, despite rising production which even at peak levels does not supply the demand.

During 1947 United States production registered one of the greatest gains in its history, climbing 6.9 percent over the peak year of 1946. More wells were producing than at any other time, and production per well was higher than ever before. The number of new wells drilled was the third greatest of any other year, only slightly less than the peak of 1937, and footage drilled exceeded even that great year. Increased mechanization of railroads, farms and industry has resulted in higher demand and consumption despite the greatly expanded use of gas for industrial use and home heating. Further increases in all phases of the petroleum industry are forecast for 1948, with no relief from peak demands seen for the next four or five years at least.

The United States produced a daily average of 5,077,100 barrels for the entire year, the first time in history that it has maintained an average greater than five million barrels, and nearly a third of a million barrels a day greater than 1946 which had reached an all-time peak at 4,749,100 barrels a day. At the close of the year the United States was producing 5,274,100 barrels a day and was exceeding that mark throughout the first part of 1948 with every indication that it would go still higher.

Significant of the success of the drilling program was the fact that notwithstanding a production of 1,853,166,000 barrels for the year, the industry added more than a billion barrels to its proved recoverable reserve which had stood at 21,924,354,000 barrels at the beginning of 1947. At the end of the year reserves stood at 23,066,576,000 barrels of crude oil and condensate. This net gain of 1,142,222,000 barrels over and above the record withdrawal, means that 2,995,388,000 barrels of new reserve were found, the greatest addition in any year since 1938. The State of Texas alone accounted for nearly 625 million barrels net addition to reserves despite a production of 817,987,000 barrels during the year, 44 percent of all the oil produced by the nation.

A sharp rise in drilling rates during 1947 resulted in the completion of 33,646 wells, approaching the figure of 35,213 wells completed in 1937, but topping the footage drilled in 1937 by more than 7½ million feet. More than one fourth of the wells drilled were in Texas, and accounted for more than one third of the total footage of 112,748,000 feet. Oklahoma was second in completions, registering an increase of 20.5 percent over 1946, and combining with Texas to account for nearly half of the total footage drilled in the nation.

In Texas, the West Texas area was responsible for the greater part of the total increase, showing a gain of 24 percent over 1946. The Ellenburger pay developed during the past few years throughout the great Permian Basin area has proved to be one of the most important operations in the United States, establishing substantial new reserve of a type of crude highly desired as a base for high quality lubricating oil.

A survey of operators indicates that despite scarcity of steel for which there seems little hope of immediate relief, the industry in the United States expects to drill upward of 35,000 wells during 1948, and operations during the early part of the year would indicate that this figure may well prove to be conservative. Although the forecast indicates a substantial

Oil Production and Producing Wells in the United States

State or District	OIL WELLS AT END OF 1947			CRUDE OIL PRODUCTION (BARRELS)				
	Flowing	Artificial Lift	Total Producing	Daily at End of 1946	Daily at End of 1947	Year 1946	Year 1947	Cumulative Through 1947
Alabama	.....	33	33	900	1,300	380,000	398,000	1,002,000
Arkansas	378	2,992	3,370	79,300	80,100	28,375,000	29,609,000	702,987,000
California	2,363	22,792	25,155	879,300	927,300	315,179,000	332,958,000	7,619,267,000
Colorado	127	411	538	38,200	46,000	12,016,000	15,766,000	82,466,000
Florida	4	1	5	300	700	57,000	260,000	363,000
Illinois	68	28,405	28,473	196,900	176,900	75,297,000	66,440,000	1,314,960,000
Indiana	2	2,807	2,809	18,000	18,200	6,726,000	6,092,000	173,351,000
Kansas	85	26,846	26,931	271,000	284,400	97,218,000	105,072,000	1,779,101,000
Kentucky	.....	14,509	14,509	26,500	27,800	10,578,000	9,469,000	224,333,000
*Louisiana	3,168	4,516	7,684	413,600	453,200	143,303,000	159,276,000	1,978,549,000
North Louisiana	925	3,478	4,403	93,500	108,200	30,768,000	36,432,000	743,279,000
South Louisiana	2,243	1,038	3,281	320,100	345,000	112,535,000	122,844,000	1,264,701,000
Michigan	276	3,356	3,632	44,000	48,500	17,074,000	16,283,000	273,101,000
Mississippi	416	636	1,052	83,800	111,100	24,216,000	35,163,000	162,252,000
Missouri	.....	36	36	100	200	51,000	55,000	453,000
Montana	24	2,455	2,479	22,500	24,800	8,801,000	8,700,000	141,576,000
Nebraska	.....	55	55	500	500	265,000	220,000	5,255,000
New Mexico	3,636	1,395	5,031	103,000	120,400	36,860,000	40,971,000	539,505,000
New York	.....	23,000	23,000	13,000	13,200	4,863,000	4,787,000	163,847,000
Ohio	50	22,825	22,875	8,000	8,800	2,908,000	3,120,000	610,545,000
Oklahoma	1,485	50,405	51,890	355,000	410,400	134,497,000	141,325,000	5,790,759,000
Pennsylvania	.....	82,800	82,800	34,700	31,800	12,996,000	12,563,000	1,089,136,000
Tennessee	.....	22	22	.....	.....	10,000	8,000	468,000
*Texas	37,070	67,909	104,979	2,022,200	2,348,600	760,505,000	817,987,000	11,242,720,000
District 1: South Central	208	3,057	3,265	19,500	24,900	7,075,000	8,120,000	266,458,000
District 2: Middle Gulf	2,723	833	3,556	138,500	163,800	51,641,000	57,293,000	452,706,000
District 3: Upper Gulf Coast	4,920	3,473	8,393	428,500	488,000	167,198,000	174,832,000	2,307,227,000
District 4: Lower Gulf-S. W.	3,854	5,147	9,001	212,900	258,000	79,662,000	88,102,000	768,576,000
District 5: East Central	342	1,344	1,686	34,000	42,300	14,297,000	14,275,000	482,079,000
District 6: Northeast	14,187	11,196	25,383	417,000	413,600	157,797,000	157,637,000	2,816,929,000
District 7-B: North Central	760	6,290	7,050	33,900	42,100	11,983,000	14,180,000	436,732,000
District 7-C: West Central	186	1,404	1,590	28,800	41,400	10,070,000	13,704,000	212,141,000
District 8: West	8,855	9,966	18,821	494,100	648,700	180,470,000	205,956,000	1,912,598,000
District 9: North	986	18,921	19,907	122,300	136,600	45,274,000	47,956,000	997,557,000
District 10: Panhandle	49	6,278	6,327	81,400	89,200	30,431,000	31,305,000	601,003,000
Utah	.....	.....	.....	.....	.....	.....	.....	11,000
Virginia	.....	12	12	200	.....	16,000	65,000	91,000
West Virginia	.....	17,000	17,000	7,300	6,900	2,929,000	2,599,000	432,603,000
Wyoming	247	3,905	4,152	106,500	133,000	38,304,000	43,980,000	749,780,000
Undistributed	.....	.....	.....	.....	.....	.....	.....	572,000
Total United States	49,399	379,123	428,522	4,724,900	5,274,100	1,733,424,000	1,853,166,000	35,079,053,000

* Data on Louisiana and Texas by districts are from various sources and so do not agree exactly with state totals, which are on Bureau of Mines basis.

AN INVITATION

To Get Acquainted With This Oil Man's Friendly Bank . . .

Years of experience and adequate finances have given us the "know-how" of sound oil financing.

One of the largest banks in Texas — ready at all times to serve the oil fraternity — through equipment loans, production loans, and complete credit information.

When in Houston, put this oil man's friendly bank on your list of "calls to make."

Capital and surplus $196,556,274.53.

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

National Bank *of* Commerce
OF HOUSTON

"THE BANK OF COURTESY"

WARM, FRIENDLY BANKING AND TRUST GUIDANCE

UNITED STATES—Continued

increase in the volume of exploratory drilling, it also shows that for the most part an effort will be made, on account of the severe shortage of tubular goods, to concentrate most of its footage in areas expected to yield the most barrels of oil per ton of steel expended. During the war years, and the shortage period since the close of the war the industry has been forced to reduce its drilling of new wells in relation to the amount of oil being produced, and on this basis is far below what might be considered sound practice even though it continues to add to reserve, and continues to produce more oil per unit of reserve in place than the average for past years.

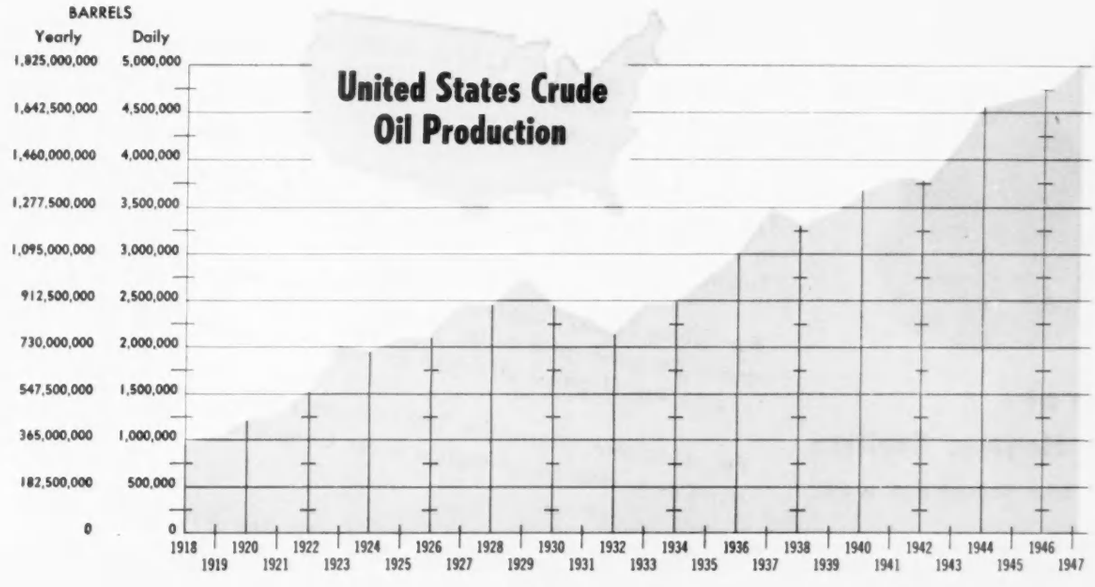
The refining industry in the nation has been severely taxed to meet the needs thrust upon it by insistent demand, and this pressure will apparently continue through the year 1948. Already drastic revisions have been made in refining practice with the increase in fuel and distillate oil consumption in relation to that of motor fuel, and to keep abreast of requirements refineries are operating at levels thought impossible a year ago. There still remains the steel shortage to contend with in construction of new refineries.

In 1947 the United States remained a net exporter of oil by the slim margin of 25,800 barrels daily, every indication is that import shipments during 1948 will average about 455,000 barrels daily against an export level of 407,000 barrels a day. Even so it is thought that imports would perhaps be even greater if more tankers for international movement were to become available.

Total demand for all oils in the United States during 1947 was 5,909,000 barrels daily, breaking all previous records, and limited for the first time in peacetime history to the actual available supply. This volume was reached only at the expense of importing more than ever before, and by a 38,000-barrel a day draft on stocks. The estimate for 1948 of 6,133,000 barrels a day is the first time that demand has gone over 6 million barrels and again is more a matter of supply than of actual potential demand. It can be met only through producing more than a quarter million barrels a day more than ever before and at the same time importing more crude and products than ever before, while reducing exports.

It is now apparent that the United States will become more and more dependent on foreign sources of supply to make up the deficit between domestic production and domestic demand. The greater part is expected to come from Venezuela, although some 32,000 barrels daily is scheduled to be brought to the East Coast from the Persian Gulf area.

Indicative of the expansion caused by recent soaring demand are the results of a survey made by the American Petroleum Institute which shows that the industry plans capital expenditures during the 1947-1948 period totaling $4 billion, which compares with a total gross investment as of the end of 1946 amounting to $18 billion. The industry plans to spend during the two-year period more than one-fifth as much in capital investment as it has spent during its entire 87-year previous history.



(All Figures in Barrels)

YEAR	Yearly Total	Daily Average	YEAR	Yearly Total	Daily Average	YEAR	Yearly Total	Daily Average
1918	355,928,000	975,000	1928	901,474,000	2,469,000	1938	1,214,355,000	3,327,000
1919	378,367,000	1,037,000	1929	1,007,323,000	2,760,000	1939	1,264,962,000	3,466,000
1920	442,929,000	1,213,000	1930	898,011,000	2,460,000	1940	1,353,214,000	3,707,000
1921	472,183,000	1,294,000	1931	851,081,000	2,332,000	1941	1,402,228,000	3,842,000
1922	557,531,000	1,528,000	1932	785,159,000	2,151,000	1942	1,386,645,000	3,799,000
1923	732,407,000	2,007,000	1933	905,656,000	2,481,000	1943	1,505,613,000	4,124,900
1924	713,940,000	1,956,000	1934	908,065,000	2,488,000	1944	1,677,904,000	4,584,400
1925	763,743,000	2,092,000	1935	996,596,000	2,730,000	1945	1,713,655,000	4,694,900
1926	770,874,000	2,112,000	1936	1,099,687,000	3,013,000	1946	1,733,424,000	4,749,100
1927	901,129,000	2,469,000	1937	1,279,160,00	3,505,000	1947	1,853,166,000	5,077,100

Source: U.S. Bureau of Mines, except for latest year, which has been calculated with aid of Bureau statistics for first 10 months and American Petroleum Institute weekly reports for last two months.

FLEXITE PLUNGERS

offer many profitable advantages!

Thousands of installations in U. S. and foreign wells have proven that FLEXITE PLUNGERS actually stay on the job longer, reduce rod breaks and shut-down time—and are ideal for those isolated locations where supply sources are too far and too few.

You have fewer rod breaks and less shut-down time because the free-falling action of the FLEXITE PLUNGER is easy on the rod string.

The FLEXITE Packing Ring is impregnated with graphite—self lubricating and friction reducing, and does not swell or corrode. Inner tension of the ring takes up wear.

Replacement FLEXITE Rings are lightweight, ready to run—no soaking or fitting required. You do not have to be a pump expert to replace the rings in a FLEXITE PLUNGER. The operation is quick and easy—an item of particular interest to foreign fields and isolated locations.

The FLEXITE PLUNGER is furnished in all A.P.I. sizes and also in sizes for special makes of pumps—either Insert Pumps or Tubing Pumps.

For Tubing Pumps FLEXITE PLUNGER is equipped with positive action patented valve puller. Simply rotate rods and Plunger to engage tap of puller in thread on standing valve.

For additional information either contact Your Supply Store, write us or refer to our section in the Composite Catalog.

Made of
Solid Haynes Stellite
—for the toughest well!

H-F offers this Solid Haynes Stellite Ball and Seat, made entirely of this famous hard material. Here is a ball and seat combination that is giving record breaking service under the severest conditions on the toughest wells. You better inquire about 'em!

All Harbison-Fischer Products Are Available

AT YOUR SUPPLY STORE

Or Thru Your Export Representative

HARBISON-FISCHER MFG. CO.

2501 Virginia St. . . . . Phone 3-9858 . . . . . Fort Worth, Texas

UNITED STATES—Crude Oil Production, by States, by Years (Part 1)

Data in thousands of barrels; from *Mineral Resources and Minerals Yearbook*, except where otherwise indicated in footnotes.

Year	Alabama	Arkansas	California	Colorado	Florida	Illinois	Indiana	Kansas	Kentucky	Louisiana	Michigan	Mississippi	Missouri	Montana	Nebraska	New Mexico
1859	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1860	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1861	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1862	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1863	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1864	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1865	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1866	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1867	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1868	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1869	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1870	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1871	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1872	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1873	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1874	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1875	.....	.....	.....	.....	.....	.....	.....	.....	E	.....	.....	.....	.....	.....	.....	.....
1876	.....	.....	12	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1877	.....	.....	13	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1878	.....	.....	15	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1879	.....	.....	20	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1880	.....	.....	40	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1881	.....	.....	100	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1882	.....	.....	129	.....	.....	.....	.....	.....	G E	.....	.....	.....	.....	.....	.....	.....
1883	.....	.....	143	.....	.....	.....	.....	.....	G5	.....	.....	.....	.....	.....	.....	.....
1884	.....	.....	262	.....	.....	.....	.....	.....	G4	.....	.....	.....	.....	.....	.....	.....
1885	.....	.....	325	.....	.....	.....	.....	.....	G5	.....	.....	.....	.....	.....	.....	.....
1886	.....	.....	377	.....	.....	.....	.....	.....	G5	.....	.....	.....	.....	.....	.....	.....
1887	.....	.....	678	76	.....	.....	.....	.....	G6	.....	.....	.....	.....	.....	.....	.....
1888	.....	.....	690	298	.....	.....	.....	.....	G5	.....	.....	.....	.....	.....	.....	.....
1889	.....	.....	303	317	.....	1	33	1	G5	.....	.....	.....	H	.....	.....	.....
1890	.....	.....	307	369	.....	1	64	1	G6	.....	.....	.....	H	.....	.....	.....
1891	.....	.....	324	666	.....	1	137	1	G9	.....	.....	.....	H	.....	.....	.....
1892	.....	.....	385	824	.....	1	698	5	G7	.....	.....	.....	H	.....	.....	.....
1893	.....	.....	470	594	.....	1	2,335	18	G3	.....	.....	.....	H	.....	.....	.....
1894	.....	.....	706	516	.....	H	3,689	40	G2	.....	.....	.....	H	.....	.....	.....
1895	.....	.....	1,209	438	.....	H	4,386	44	G2	.....	.....	.....	H	.....	.....	.....
1896	.....	.....	1,253	361	.....	H	4,681	114	G2	.....	.....	.....	H	.....	.....	.....
1897	.....	.....	1,903	385	.....	1	4,122	81	G H	.....	.....	.....	H	.....	.....	.....
1898	.....	.....	2,257	444	.....	H	3,731	72	G6	.....	.....	.....	H	.....	.....	.....
1899	.....	.....	2,642	390	.....	H	3,848	70	G18	.....	.....	.....	H	.....	.....	.....
1900	.....	.....	4,325	317	.....	H	4,874	75	G62	.....	J	.....	J2	.....	.....	.....
1901	.....	.....	8,787	461	.....	H	5,757	179	G137	.....	J	.....	J2	.....	.....	.....
1902	.....	.....	13,984	397	.....	H	7,481	332	G185	549	J	.....	J1	.....	.....	.....
1903	.....	.....	24,382	484	.....	.....	9,186	932	G554	918	J	.....	J3	.....	.....	.....
1904	.....	.....	29,649	501	.....	.....	11,339	4,251	G998	2,959	J	.....	J3	.....	.....	.....
1905	.....	.....	33,428	376	.....	181	10,964	I3,750	G1,217	8,910	J	.....	J3	.....	.....	.....
1906	.....	.....	33,099	328	.....	4,397	7,674	I3,627	G1,214	9,077	J	.....	J3	.....	.....	.....
1907	.....	.....	39,748	332	.....	24,282	5,128	2,410	G821	5,000	J	.....	J4	.....	.....	.....
1908	.....	.....	44,855	380	.....	33,686	3,283	1,801	728	5,789	J	.....	J15	.....	.....	.....
1909	.....	.....	55,472	311	.....	30,898	2,296	1,264	639	3,060	J	.....	J6	.....	.....	.....
1910	.....	.....	73,011	240	.....	33,143	2,160	1,128	469	6,841	J	.....	J4	.....	.....	.....
1911	.....	.....	81,134	227	.....	31,317	1,695	1,279	472	10,721	J	.....	J8	.....	.....	.....
1912	.....	.....	87,269	206	.....	28,602	970	1,593	484	9,263	K	.....	.....	.....	.....	.....
1913	.....	.....	97,788	189	.....	23,894	956	2,375	525	12,499	K	.....	K	.....	.....	K
1914	.....	.....	99,775	223	.....	21,920	1,336	3,104	503	14,309	K	.....	K	.....	.....	.....
1915	.....	.....	86,592	208	.....	19,042	876	2,823	437	18,192	K	.....	K	.....	.....	.....
1916	.....	.....	90,952	197	.....	17,714	769	8,738	L1,202	15,248	K	.....	K	45	.....	.....
1917	.....	.....	93,878	121	.....	15,777	760	36,536	L3,088	11,392	K	.....	.....	100	.....	.....
1918	.....	.....	97,532	143	.....	13,366	878	45,451	L4,368	16,043	K	.....	.....	69	.....	.....
1919	.....	.....	101,183	121	.....	11,960	972	33,048	9,278	17,188	K	.....	K	90	.....	K
1920	.....	K	103,377	111	.....	10,774	945	39,005	8,738	35,714	.....	.....	K	340	.....	K
1921	.....	10,473	112,600	108	.....	10,043	1,158	36,456	9,013	27,103	.....	.....	K	1,509	.....	K
1922	.....	12,712	138,468	97	.....	9,383	1,087	31,766	8,973	35,376	.....	.....	K	2,449	.....	K
1923	.....	36,610	262,876	86	.....	8,707	1,043	28,250	8,069	24,919	.....	.....	K	2,782	.....	K
1924	.....	46,028	228,933	445	.....	8,081	935	28,836	7,407	21,124	.....	.....	.....	2,815	.....	98
1925	.....	77,398	232,492	1,226	.....	7,863	829	38,357	6,759	20,272	4	.....	.....	4,091	.....	1,060
1926	.....	58,332	224,673	2,768	.....	7,760	808	41,498	6,274	23,201	94	.....	.....	7,727	.....	1,666
1927	.....	40,005	231,196	2,831	.....	6,994	852	41,069	6,719	22,818	439	.....	.....	5,058	.....	1,226
1928	.....	32,096	231,811	2,774	.....	6,462	1,052	38,596	7,359	21,847	594	.....	.....	4,015	.....	943
1929	.....	24,917	292,534	2,358	.....	6,319	981	42,813	7,775	20,554	4,528	.....	.....	3,980	.....	1,830
1930	.....	19,702	227,329	1,656	.....	5,736	994	41,638	7,389	23,272	3,911	.....	.....	3,349	.....	10,189
1931	.....	14,791	188,830	1,545	.....	5,039	840	37,018	6,456	21,804	3,789	.....	.....	2,830	.....	15,227
1932	.....	12,051	178,128	1,136	.....	4,673	806	34,848	6,287	21,807	6,910	.....	K	2,457	.....	12,455
1933	.....	11,686	172,010	919	.....	4,244	737	41,976	4,608	25 168	7,942	K	K	2,273	.....	14,116
1934	.....	11,182	174,305	1,139	.....	4,479	838	46,482	4,860	32,869	10,603	K	K	3,603	.....	16,864
1935	.....	11,008	207,832	1,560	.....	4,322	777	54,843	5,258	50,330	15,776	K	K	4,603	.....	20,483
1936	.....	10,469	214,773	1,650	.....	4,475	822	58,317	5,633	80,491	11,928	.....	K	5,868	.....	27,223
1937	.....	11,764	238,521	1,605	.....	7,499	844	70,761	5,484	90,924	16,628	.....	K	5,805	.....	38,854
1938	.....	18,180	249,749	1,412	.....	24,075	995	60,064	5,821	95,208	18,745	.....	K	4,946	.....	35,759
1939	.....	21,238	224,354	1,404	.....	94,912	1,711	60,703	5,621	93,646	23,462	107	40	5,960	2	37,637
1940	.....	25,775	223,881	1,626	.....	147,647	4,978	66,139	5,188	103,584	19,753	4,400	44	6,728	276	39,129
1941	.....	26,327	230,263	2,150	.....	132,393	7,411	83,242	4,762	115,908	16,359	15,327	47	7,526	1,898	39,569
1942	.....	26,628	248,326	2,199	.....	106,391	6,743	97,636	4,534	115,785	21,754	28,833	36	8,074	1,237	31,544
1943	.....	27,600	284,188	2,320	4	82,260	5,283	106,178	7,883	123,592	20,768	18,807	36	7,916	635	38,896
1944	43	29,418	311,793	3,083	12	77,413	5,118	98,762	9,621	129,645	18,490	16,337	45	8,647	417	39,555
1945	181	28,613	326,482	5,036	30	75,094	4,868	96,415	10,325	131,051	17,267	19,062	45	8,420	305	37,351
1946	380	28,375	315,179	12,016	57	75,297	6,726	97,218	10,578	143,303	17,074	24,216	51	8,801	265	36,860
1947P	398	29,609	332,958	15,766	260	66,440	6,092	105,072	9,469	159,276	16,283	35,163	55	8,700	220	40,971
Total	1,002	702,987	7,619,267	82,466	363	1,314,960	173,351	1,779,101	224,333	1,978,549	273,101	162,252	453	141,576	5,255	539,505

[A] Utah production estimated at 3,650 barrels in 1939; 3,126 barrels in 1940; and 189,726 barrels cumulative through 1940.

[B] *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer, shows for Alaska the following data: 1904-1919, estimated, 56,000 barrels; 1920, 11,000 barrels; 1921, 10,000 barrels; 1922-1928, estimated, 73,000 barrels; total, 1904-1928, 150,000 barrels.

[C] "Unclassified" includes 1912, Alaska and Michigan; 1913, Alaska, Michigan, Missouri and New Mexico; 1914-16, Alaska, Michigan and Missouri; 1917-18, Alaska and Michigan; 1919, Alaska, Michigan, Missouri and New Mexico; 1920, Alaska, Arkansas, Missouri, New Mexico and Utah; 1921-23, Alaska, Missouri and New Mexico; 1924-31, Alaska and Utah; 1932, Alaska, Missouri and Utah; 1933, Alaska, Mississippi, Missouri and Utah; 1934, Mississippi, Missouri and Utah; 1935, Mississippi, Missouri, Tennessee and Utah; 1936-40, Missouri, Tennessee and Utah; 1943, Virginia, 2; 1946, Virginia, 3.

[D] Pennsylvania and New York separated in years 1864-1881, by aid of *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer.

[E] *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer, gives the following additional estimates which are not shown by the official *Mineral Resources*: Ohio, 1860-1875, 200,000 barrels; West Virginia, 1860-1875, 2,800,000 barrels; Kentucky, 1860-1882, 161,000 barrels.

★ Thorough Inspection ★ Light Weight
★ Simple to Operate ★ Dependable Service

D. E. STEARNS
SHREVEPORT, LOUISIANA

POST OFFICE BOX 1234

A Dependable Organization
providing the
Finest Holiday Detector Equipment
for the
Entire Pipe Line Industry

Via Air - Anywhere

BETTER COATINGS CONSERVE STEEL

UNITED STATES—Crude Oil Production, by States, by Years—Continued

Data in thousands of barrels; from *Mineral Resources and Minerals Yearbook*, except where otherwise indicated in footnotes.

Year	New York	Ohio	Oklahoma	Pennsylvania	Tennessee	Texas	[A] Utah	Virginia	West Virginia	Wyoming	[B] Alaska	[C] Unclassified	Total United States	Total Value At Wells (Thousands of Dollars)	[O] Average Value per Bbl.
1859	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	2	$ 32	$20.00
1860	.....	E	.....	500	.....	.....	.....	.....	E	.....	.....	.....	500	4,800	9.60
1861	.....	E	.....	2,114	.....	.....	.....	.....	E	.....	.....	.....	2,114	1,036	.52
1862	.....	E	.....	3,057	.....	.....	.....	.....	E	.....	.....	.....	3,057	3,210	1.05
1863	.....	E	.....	2,611	.....	.....	.....	.....	E	.....	.....	.....	2,611	8,226	3.15
1864	D F H	E	.....	D F 2,116	.....	.....	.....	.....	E	.....	.....	.....	2,116	20,897	8.15
1865	D100	E	.....	D2,398	.....	.....	.....	.....	E	.....	.....	.....	2,498	16,460	6.59
1866	D144	E	.....	D3,454	.....	.....	.....	.....	E	.....	.....	.....	3,598	13,455	3.75
1867	D134	E	.....	D3,213	.....	.....	.....	.....	E	.....	.....	.....	3,347	8,067	2.40
1868	D146	E	.....	D3,500	.....	.....	.....	.....	E	.....	.....	.....	3,646	13,217	3.62
1869	D169	E	.....	D4,046	.....	.....	.....	.....	E	.....	.....	.....	4,215	23,730	5.60
1870	D211	E	.....	D5,050	.....	.....	.....	.....	E	.....	.....	.....	5,261	20,504	3.90
1871	D208	E	.....	D4,997	.....	.....	.....	.....	E	.....	.....	.....	5,205	22,591	4.40
1872	D252	E	.....	D6,041	.....	.....	.....	.....	E	.....	.....	.....	6,293	21,440	3.75
1873	D396	E	.....	D9,498	.....	.....	.....	.....	E	.....	.....	.....	9,894	18,100	1.80
1874	D437	E	.....	D10,490	.....	.....	.....	.....	E	.....	.....	.....	10,927	12,648	1.15
1875	D352	E	.....	D8,436	.....	.....	.....	.....	E	.....	.....	.....	8,788	7,368	.97
1876	D359	32	.....	D8,610	G	.....	.....	.....	120	.....	.....	.....	9,133	22,983	2.52
1877	D525	30	.....	D12,610	G	.....	.....	.....	172	.....	.....	.....	13,350	31,789	2.38
1878	D607	38	.....	D14,557	G	.....	.....	.....	180	.....	.....	.....	15,397	18,045	1.17
1879	D787	29	.....	D18,898	G	.....	.....	.....	180	.....	.....	.....	19,914	17,211	.86
1880	D1,041	39	.....	D24,987	G	.....	.....	.....	179	.....	.....	.....	26,286	24,601	.94
1881	D1,095	34	.....	D26,281	G	.....	.....	.....	151	.....	.....	.....	27,661	25,448	.92
1882	6,685	40	.....	23,368	G	.....	.....	.....	128	.....	.....	.....	30,350	23,631	.78
1883	4,004	47	.....	19,125	G	.....	.....	.....	126	.....	.....	.....	23,450	25,790	1.10
1884	3,231	90	.....	20,541	G	.....	.....	.....	90	.....	.....	.....	24,218	20,596	.85
1885	2,658	662	.....	18,118	G	.....	.....	.....	91	.....	.....	.....	21,859	19,198	.88
1886	2,151	1,783	.....	23,647	G	.....	.....	.....	102	.....	.....	.....	28,065	19,996	.71
1887	2,075	5,023	.....	20,281	G	.....	.....	.....	145	.....	.....	.....	28,283	18,877	.67
1888	1,789	10,011	.....	14,700	G	.....	.....	.....	119	.....	.....	.....	27,612	17,948	.65
1889	1,897	12,472	.....	19,591	G	H	.....	.....	544	.....	.....	.....	35,164	26,963	.77
1890	1,658	16,125	.....	26,800	G	.....	.....	.....	493	.....	.....	.....	45,824	35,365	.77
1891	1,585	17,740	H	31,424	G	H	.....	.....	2,406	.....	.....	.....	54,293	30,527	.56
1892	1,273	16,363	H	27,149	G	H	.....	.....	3,810	.....	.....	.....	50,515	25,907	.51
1893	1,032	16,249	H	19,283	G	H	.....	.....	8,446	.....	.....	.....	48,431	28,950	.60
1894	942	16,792	H	18,078	G	H	.....	.....	8,577	2	.....	.....	49,344	35,522	.72
1895	913	19,545	H	18,231	G	H	.....	.....	8,120	4	.....	.....	52,892	57,632	1.09
1896	1,205	23,941	H	19,379	G	1	.....	.....	10,020	3	.....	.....	60,960	58,519	.96
1897	1,279	21,561	1	17,983	G	66	.....	.....	13,090	4	.....	.....	60,476	40,874	.68
1898	1,205	18,739	.....	14,743	G	546	.....	.....	13,615	6	.....	.....	55,364	44,193	.80
1899	1,321	21,142	.....	13,054	G	669	.....	.....	13,911	6	.....	.....	57,071	64,604	1.13
1900	1,301	22,363	6	13,258	G	836	.....	.....	16,196	6	.....	.....	63,621	75,989	1.19
1901	1,207	21,648	10	12,625	G	4,394	.....	.....	14,177	5	.....	.....	69,389	66,417	.96
1902	1,120	21,014	37	12,064	G	18,084	.....	.....	13,513	6	.....	.....	88,767	71,179	.80
1903	1,163	20,480	139	11,355	G	17,956	.....	.....	12,900	9	.....	.....	100,461	94,694	94
1904	1,113	18,877	1,367	11,126	G	22,241	.....	.....	12,645	12	N	.....	117,081	101,175	.86
1905	1,118	16,347	18,264	10,437	G	28,136	.....	.....	11,578	8	.....	.....	134,717	84,157	.62
1906	1,243	14,788	118,091	10,257	G	12,568	.....	.....	10,121	7	.....	.....	126,494	92,445	.73
1907	1,212	12,207	43,524	10,000	G	12,323	M	.....	9,095	M9	N	.....	166,095	120,107	.72
1908	1,160	10,859	45,799	9,424	.....	11,207	M	.....	9,523	M18	.....	.....	178,527	129,079	.72
1909	1,135	10,633	47,859	9,299	.....	9,534	M	.....	10,745	M20	.....	.....	183,171	128,329	.70
1910	1,054	9,916	52,029	8,795	.....	8,899	M	.....	11,753	M115	.....	.....	209,557	127,900	.61
1911	953	8,817	56,069	8,248	.....	9,526	M	.....	9,796	M187	N	.....	220,449	134,045	.61
1912	874	8,969	51,427	7,838	.....	11,735	M	.....	12,129	M1,572	K	4	222,935	164,213	.74
1913	948	8,781	63,579	7,917	.....	15,010	N	.....	11,567	2,407	K	11	248,446	237,121	.95
1914	939	8,536	73,632	8,170	.....	20,068	N	.....	9,680	3,560	K	8	265,763	214,125	.81
1915	888	7,825	97,915	7,838	.....	24,943	N	.....	9,265	4,246	K	14	281,104	179,463	.64
1916	874	7,744	107,072	7,593	L1	27,645	N	.....	8,731	6,234	K	8	300,767	330,900	1.10
1917	880	7,751	107,508	7,733	L12	32,413	N	.....	8,379	8,978	K	10	335,316	522,635	1.56
1918	809	7,285	103,347	7,408	L8	38,750	N	.....	7,867	12,596	K	8	355,928	703,944	1.98
1919	851	7,736	86,911	8,137	15	79,366	N	.....	8,327	13,172	K	12	378,367	760,266	2.01
1920	906	7,400	106,206	7,438	14	96,868	K	.....	8,249	16,831	K	13	442,929	1,360,745	3.07
1921	988	7,335	114,634	7,418	12	106,166	.....	.....	7,822	19,333	K	12	472,183	814,745	1.73
1922	1,000	6,781	149,571	7,425	10	118,684	.....	.....	7,021	26,715	K	13	557,531	895,111	1.61
1923	1,250	7,085	160 929	7,609	8	131,023	.....	.....	6,358	44,785	K	18	732,407	978,430	1.34
1924	1,440	6,811	173,538	7,486	10	134,522	K	.....	5,920	39,498	K	13	713,940	1,022,683	1.43
1925	1,695	7,212	176,768	8,097	24	144,648	K	.....	5,763	29,173	K	12	763,743	1,284,960	1.68
1926	1,956	7,272	179,195	8,961	43	166,916	K	.....	5,946	25,776	K	8	770,874	1,447,760	1.88
1927	2,242	7,593	277,775	9,526	60	217,389	K	.....	6,023	21,307	K	7	901,129	1,172,830	1.30
1928	2,603	7,015	249,857	9,956	46	257,320	K	.....	5,661	21,461	K	6	901,474	1,054,880	1.17
1929	3,377	6,743	255,004	11,820	19	296,876	K	.....	5,574	19,314	K	7	1,007,323	1,280,417	1.27
1930	3,647	6,486	216,486	12,803	21	290,457	K	.....	5,071	17,868	K	7	898,011	1,070,200	1.19
1931	3,363	5,327	180,574	11,892	6	332,437	K	.....	4,472	14,834	K	7	851,081	550,630	.65
1932	3,508	4,644	153,244	12,412	5	312,478	K	.....	3,876	13,418	K	16	785,159	680,460	.87
1933	3,181	4,235	182,251	12,624	5	402,609	K	.....	3,815	11,227	K	30	905,656	608,000	.67
1934	3,804	4,234	180,107	14,478	10	381,516	K	.....	4,095	12,556	.....	41	908,065	904,825	1.00
1935	4,236	4,082	185,288	15,810	K	392,666	K	.....	3,902	13,755	.....	65	996,596	961,440	.96
1936	4,663	3,847	206,555	17,070	K	427,411	K	.....	3,847	14,582	.....	63	1,099,687	1,199,820	1.09
1937	5,478	3,559	228,839	19,189	K	510,318	K	.....	3,845	19,166	.....	77	1,279,160	1,513,340	1.18
1938	5,045	3,298	174,994	17,426	K	475,850	K	.....	3,684	19,022	.....	82	1,214,355	1,373,060	1.13
1939	5,098	3,156	159,913	17,382	50	483,528	4	.....	3,580	21,454	.....	.....	1,264,962	1,294,470	1.02
1940	4,999	3,159	156,164	17,353	24	493,209	3	.....	3,444	25,711	.....	.....	1,353,214	1,385,440	1.02
1941	5,185	3,510	154,702	16,750	12	505,572	4	.....	3,433	29,878	.....	.....	1,402,228	1,602,000	1.14
1942	5,421	3,543	140,690	17,779	9	483,097	.....	.....	3,574	32,812	.....	.....	1,386,645	1,643,470	1.19
1943	5,059	3,322	123,152	15,757	10	594,343	.....	2	3,349	34,253	.....	.....	1,505,613	1,809,020	1.20
1944	4,697	2,937	124,616	14,118	8	746,699	.....	4	3,070	33,356	.....	.....	1,677,904	2,032,960	1.21
1945	4,648	2,828	139,299	12,515	8	754,710	.....	4	2,879	36,219	.....	.....	1,713,655	2,094,250	1.22
1946	4,863	2,908	134,497	12,996	10	760,505	.....	16	2,929	38,304	.....	.....	1,733,424	2,461,462	1.42
1947[P]	4,787	3,120	141,325	12,563	8	817,987	.....	65	2,599	43,980	.....	.....	1,853,166	3,609,533	1.95
Total	163,847	610,545	5,790,759	1,089,136	468	11,242,720	11	91	432,603	749,780	.....	572	35,079,053	43,396,074	1.24

[F] New York included with Pennsylvania.

[G] Tennessee included with Kentucky, 1876-1907, inclusive.

[H] Less than 500 barrels.

[I] Figures for Oklahoma and Kansas for years 1905-1906 shown together by *Mineral Resources*; here divided by aid of *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer.

[J] Michigan shown with Missouri in 1900-1911.

[K] Included under "Unclassified."

[L] Kentucky and Tennessee figures in years 1916-18 obtained with aid of *Mineral Resources* and *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer.

[M] Insignificant production of Utah (mostly used as fuel) shown with Wyoming.

[N] Little production but no record available.

[O] Figures on average price per barrel for years 1859-1875 taken from *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer; remainder from *Mineral Resources* and *Minerals Yearbook* except 1946, and 1947 estimated.

[P] Bureau of Mines figures for first 10 months; November and December estimated by The Oil Weekly, with aid of weekly reports of American Petroleum Institute and other sources.

Symbol of Quality Wherever Oil is Used

From the finer crudes of the rich mid-continent fields, Mid-Continent Petroleum Corporation refines a complete line of petroleum products that have been known for their higher quality for more than 30 years.

Wherever petroleum products are used, "D-X," the trade-mark under which many of these Mid-Continent products are sold, has become synonymous with quality. The name Mid-Continent itself has become synonymous with dependability . . . to motorists, farmers, and to industry.

Products of Mid-Continent Petroleum Corporation are sold abroad in practically every major export market of the world and in the Central United States through more than 8,000 D-X bulk and service stations:

Motor Fuels	Paraffin Oils	Automotive Lubricants
Diesel Fuels	Transmission Oils	Heating Oils
Tractor Fuels	Industrial Oils	Waxes
Motor Oils	Solvent Bright Stocks and Neutrals	Petrolatums
Heavy Duty Oils	Conventional Bright Stocks and Neutrals	Insecticides
Aviation Oils		Stock Sprays
Blended Oils		Specialty Products

MID-CONTINENT PETROLEUM CORPORATION

Waterloo, Ia. Terre Haute, Ind. TULSA, OKLA. Chicago, Ill. Omaha, Nebr.

UNITED STATES—Natural Gas Marketed Production

(Millions of Cubic Feet)

Sources: U. S. Bureau of Mines, except for some figures for early years which are from "Petroleum in the United States and Possessions" by Ralph Arnold and William J. Kemnitzer, and except where otherwise indicated by footnotes.

YEAR	Arkansas	California	Colorado	Illinois	Indiana	Kansas	Kentucky	Louisiana	Michigan	Mississippi	Montana	New Mexico	New York
ePre-1906	281	9,810	631	1,505	471,800	81,865	13,243	31	.....	.....	.....	.....	31,340
1906	21	153	23	410	7,861	69,323	789	39	.....	.....	.....	.....	2,548
1907	e570	230	57	1,155	6,624	76,707	1,303	88	.....	.....	.....	.....	3,288
1908	e1,208	479	50	4,979	5,256	80,740	1,430	252	.....	.....	.....	.....	3,843
1909	e1,778	2,324	e45	8,473	6,159	75,074	2,097	1,365	1	.....	.....	.....	4,696
1910	e2,412	2,764	e40	6,723	5,760	59,380	1,357	4,110	1	.....	.....	.....	6,010
1911	e1,994	6,390	e35	6,762	4,365	38,800	1,275	9,786	2	.....	.....	.....	5,240
1912	e1,465	9,355	e30	5,603	3,618	28,068	1,951	14,493	2	.....	.....	.....	8,626
1913	e806	11,035	e27	4,767	2,921	22,884	1,821	26,653	2	.....	.....	.....	8,515
1914	e633	17,829	e24	3,548	2,580	22,628	1,422	26,775	2	.....	.....	.....	8,935
1915	992	21,891	e21	2,690	2,261	27,046	1,667	25,540	2	.....	6	.....	7,977
1916	2,388	31,643	e18	3,534	1,715	31,710	2,107	32,081	1	.....	213	.....	8,036
1917	5,610	49,427	e14	4,439	1,712	24,439	2,802	31,287	1	.....	334	.....	8,372
1918	5,295	39,719	10	4,473	1,667	27,825	3,022	36,094	1	.....	177	.....	8,461
1919	5,587	55,607	10	3,825	1,407	16,150	2,057	47,062	1	.....	858	.....	8,124
1920	9,027	66,041	8	3,013	1,779	21,158	3,345	58,274	.....	.....	818	.....	8,419
1921	4,260	75,942	4	2,646	1,066	15,717	4,820	58,004	.....	.....	336	.....	6,583
1922	9,700	84,580	4	3,383	947	20,289	5,872	70,267	1	.....	486	.....	6,947
1923	24,215	131,434	1	4,049	880	30,913	11,953	112,031	1	.....	1,470	.....	6,497
1924	36,616	189,692	48	4,072	998	25,580	12,875	160,945	1	.....	1,071	.....	6,196
1925	41,878	187,789	574	4,165	1,168	26,917	10,770	152,620	.....	.....	1,496	.....	6,210
1926	43,566	204,915	554	3,808	901	38,095	10,410	157,423	.....	.....	2,283	921	7,027
1927	30,450	212,364	1,725	3,741	1,124	42,646	10,206	186,961	1	.....	4,253	1,019	5,908
1928	20,235	246,215	2,931	3,051	1,290	45,644	15,383	227,821	469	.....	6,277	838	7,224
1929	19,928	342,214	2,787	2,983	1,012	38,469	27,588	261,138	4,526	90	9,659	3,054	8,387
1930	18,585	334,789	3,312	2,890	1,217	37,630	28,023	278,341	2,075	179	10,060	9,497	9,624
1931	13,300	305,930	2,536	2,130	1,337	38,742	27,870	224,155	472	6,048	10,940	19,354	7,868
1932	10,235	263,484	2,547	1,769	1,349	40,690	29,005	201,561	968	8,648	13,295	17,604	8,813
1933	8,288	259,799	2,449	1,631	1,544	41,596	31,380	197,826	1,528	8,679	14,391	19,148	6,865
1934	7,024	268,122	2,633	1,868	1,802	46,909	33,124	225,713	2,789	8,245	14,971	24,075	6,278
1935	6,167	284,109	2,843	1,448	1,777	57,125	39,738	249,450	4,203	9,643	19,870	27,931	8,288
1936	8,500	320,406	3,687	865	2,241	69,178	43,903	290,151	7,167	11,821	23,003	33,928	12,431
1937	9,690	329,769	3,186	1,040	1,551	83,890	55,719	315,301	9,080	13,348	24,765	46,337	21,325
1938	11,301	315,168	1,904	1,169	1,299	75,203	46,163	283,899	10,165	13,656	21,216	50,706	39,402
1939	10,107	348,361	2,015	2,746	791	80,556	47,771	294,370	10,726	14,527	23,178	60,284	29,222
1940	14,379	351,950	2,533	8,359	1,137	90,003	53,056	343,191	12,648	6,365	26,231	63,990	12,187
1941	19,148	374,905	3,256	10,053	1,522	111,121	69,067	403,855	13,916	4,268	28,499	64,655	10,456
1942	19,456	403,968	4,865	14,484	1,599	112,921	80,089	447,686	15,521	2,082	31,475	78,164	8,718
1943	36,469	457,757	6,445	18,120	1,450	133,729	92,364	505,294	18,006	1,461	31,562	86,500	8,062
1944	46,453	502,017	5,141	18,137	1,014	157,733	94,223	534,688	19,653	1,352	32,102	87,727	7,052
1945	46,600	502,442	4,914	16,663	1,543	145,959	81,714	542,789	21,874	4,587	31,829	105,023	9,210
1946	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.
1947	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.
Total	556,617	7,622,818	63,937	201,169	560,044	2,311,052	1,004,774	7,039,410	155,806	114,999	387,133	800,755	399,210

YEAR	Ohio	Oklahoma	Pennsylvania	Texas	West Virginia	Wyoming	Others	Total United States	VALUE AT WELLS		VALUE AT POINTS OF CONSUMPTION	
									Total (Thousands of Dollars)	Average Per M Cubic Ft. (Cts.)	Total (Thousands of Dollars)	Average Per M Cubic Ft. (Cts.)
ePre-1906	305,593	2,215	1,611,066	815	387,799	506	43,281	**2,961,781**	.....	....	426,448	14.4
1906	45,436	3,520	138,161	e1,000	119,400	e100	59	**388,843**	.....	....	46,874	12.1
1907	52,041	4,867	135,516	e1,200	122,687	e140	149	**406,622**	.....	....	54,222	13.3
1908	47,442	11,925	130,476	e1,500	112,181	e180	200	**402,141**	.....	....	54,640	13.6
1909	53,223	28,037	127,697	e3,000	166,435	e220	82	**480,706**	.....	....	63,207	13.1
1910	48,232	50,430	126,867	e4,000	190,706	e253	109	**509,155**	.....	....	70,756	13.9
1911	49,450	67,276	108,869	5,503	206,891	e265	90	**512,993**	.....	....	74,622	14.5
1912	56,210	73,799	112,150	7,470	239,007	e247	109	**562,203**	.....	....	84,564	15.0
1913	50,612	75,018	118,860	12,160	245,454	e273	90	**581,898**	.....	....	87,847	15.1
1914	68,270	78,167	110,745	13,434	236,489	e306	80	**591,867**	.....	....	94,116	15.9
1915	79,510	87,517	113,692	13,324	244,004	e321	118	**628,579**	.....	....	101,312	16.1
1916	69,888	123,517	130,484	15,810	299,319	e557	149	**753,170**	.....	....	120,227	16.0
1917	68,917	137,384	133,397	17,047	308,617	e1,209	102	**795,110**	.....	....	142,089	17.9
1918	61,261	124,317	123,813	13,440	265,161	4,339	1,926	**721,001**	.....	....	153,554	21.3
1919	63,153	163,649	113,489	24,710	234,095	6,014	118	**745,916**	.....	....	160,888	21.6
1920	58,938	154,467	125,787	37,063	239,719	10,312	42	**798,210**	.....	....	196,194	24.6
1921	47,412	124,058	86,144	44,504	174,921	15,608	27	**662,052**	.....	....	174,617	26.4
1922	51,481	140,631	101,276	47,945	195,288	23,427	22	**762,546**	84,873	11.1	221,535	29.1
1923	53,812	203,082	112,562	74,535	203,867	35,523	151	**1,006,976**	100,849	10.0	240,001	23.8
1924	47,396	214,452	105,863	107,247	182,285	46,036	148	**1,141,521**	105,779	9.3	253,856	22.2
1925	43,235	249,285	101,632	134,872	180,345	45,539	76	**1,188,571**	112,047	9.4	265,271	22.3
1926	47,363	286,421	107,089	175,392	180,223	46,567	61	**1,313,019**	124,693	9.5	300,168	22.9
1927	51,381	326,864	105,709	254,063	162,375	43,582	1,056	**1,445,428**	127,468	8.8	317,930	22.0
1928	56,341	320,861	99,466	301,990	163,018	47,490	1,595	**1,568,139**	139,898	8.9	363,726	23.2
1929	57,936	357,893	101,951	464,928	167,333	44,648	1,169	**1,917,693**	157,596	8.2	413,276	21.6
1930	63,394	348,116	88,706	517,880	144,180	43,219	1,704	**1,943,421**	147,048	7.6	416,090	21.4
1931	56,326	263,685	74,797	464,580	124,797	39,770	1,790	**1,686,436**	117,505	7.0	392,816	23.3
1932	51,466	255,487	61,611	456,832	100,540	28,938	1,148	**1,555,990**	98,985	6.4	384,632	24.7
1933	47,929	245,759	63,579	475,691	100,653	25,830	909	**1,555,474**	97,096	6.2	368,540	23.7
1934	50,330	254,457	86,238	602,976	109,161	23,148	858	**1,770,721**	106,438	6.0	395,378	22.3
1935	49,592	274,313	94,464	642,366	115,772	26,643	853	**1,916,595**	110,402	5.8	429,374	22.4
1936	46,994	280,481	110,362	734,561	138,076	29,322	725	**2,167,802**	119,193	5.5	476,813	22.0
1937	42,783	296,260	115,928	854,561	149,084	31,023	2,980	**2,407,620**	123,457	5.1	528,354	21.9
1938	35,257	263,164	76,547	882,473	134,342	26,678	5,850	**2,295,562**	113,571	4.9	500,698	21.8
1939	36,469	250,875	93,882	979,427	159,226	26,614	5,609	**2,476,756**	120,243	4.9	534,240	21.6
1940	40,639	257,626	90,725	1,063,538	188,751	27,346	5,568	**2,660,222**	120,493	4.5	577,939	21.7
1941	41,858	234,054	92,819	1,086,312	207,681	29,284	5,929	**2,812,658**	138,508	4.9	621,338	22.1
1942	45,055	269,704	93,532	1,170,345	215,193	33,124	5,494	**3,053,475**	154,236	5.1	692,737	22.7
1943	52,001	285,045	93,543	1,323,885	223,787	34,351	4,858	**3,414,689**	176,893	5.2	760,950	22.3
1944	51,724	310,888	92,987	1,525,515	181,452	34,521	6,660	**3,711,039**	189,263	5.1	797,873	21.5
1945	49,967	357,530	82,188	1,711,401	160,225	35,282	6,946	**3,918,686**	192,016	4.9	838,599	21.4
1946	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	**p4,040,000**	n. a.	n. a.	p888,800	p22.0
1947	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	n. a.	**p4,400,000**	n. a.	n. a.	p1,015,000	p23.1
Total	2,396,317	7,857,096	5,794,669	16,269,295	7,680,539	868,755	108,891	**70,633,286**	n. a.	n. a.	15,102,106	21.4

e Indicates figures are estimates. p Indicates figures are preliminary and subject to revision. n. a. means not available. Bureau has not yet released figures that break national totals for recent years into state figures.

WHILE YOU READ THIS ADVERTISEMENT

CORROSION
TAKES ITS TOLL ON RIG AND TANK

Every piece of your equipment — in the field, in storage, or securely housed — is under the continuous attack of the forces of corrosion. A speck of rust grows into an unsightly blob, becomes a hole . . . and another piece of expensive, hard to replace equipment is that much closer to becoming junk.

Years of testing in oil fields and refineries have developed a complete line of protective coatings which can be your sure ally in the fight against corrosion. Called RUST-BAN, these products protect everything from fine machined parts to buried pipe. Discuss your particular corrosion problems with the technical service engineers of any of the RUST-BAN distributors listed below.

Rust-Ban 345: For machined surfaces, threaded parts, castings and forgings, dies.

Rust-Ban 355: For cooling tower fan houses, elevator cables, metal structures in salt water.

Rust-Ban 392: For neutralizing finger print stains and preserving highly finished precision parts.

Rust-Ban 240: For oil field tanks, machinery, derricks and miscellaneous equipment.

. . . and many others.

RUST-BAN

REG. U. S. PAT. OFF.

RUST-BAN is sold by: Penola Inc., Chicago, Ill.; Esso Standard Oil Co. of Pennsylvania, Philadelphia, Pa.; Esso Standard Oil Company, New York, N. Y.; Humble Oil & Refining Company, Houston, Texas; The Carter Oil Company, Tulsa, Okla.; Standard Oil Company (Ky.), Louisville, Ky.; Standard Oil Company (Ohio), Cleveland, Ohio; and Imperial Oil Ltd., Toronto, Canada.

UNITED STATES—Refinery Runs and Capacities

Runs from Bureau of Mines, except November and December, 1947, from American Petroleum Institute; Capacities from American Petroleum Institute.

(THOUSANDS OF BARRELS)

Refining District	CRUDE RUN IN DECEMBER: Total Amount Run During Month				CRUDE RUN IN DECEMBER: Daily Average Run During Month			REFINING CAPACITY AND USE IN DECEMBER: Daily Capacity			REFINING CAPACITY AND USE IN DECEMBER: Percent Capacity Used			CRUDE RUN DURING YEAR: Total Amount Run During Year			CRUDE RUN DURING YEAR: Daily Average Run During Year			
	Dec. 1941	Dec. 1946	Dec. 1947	% Diff. 1946-1947	Dec. 1941	Dec. 1946	Dec. 1947	Dec. 1941	Dec. 1946	Dec. 1947	Dec. 1941	Dec. 1946	Dec. 1947	1941	1946	1947	1941	1946	1947	% Diff. 1946-1947
East Coast	19,750	23,343	25,357	+ 8.6	637	753	818	704	839	819	90.5	89.7	99.9	217,046	276,651	296,379	595	758	812	+ 7.1
Appalachian	4,575	4,960	5,251	+ 5.9	148	160	169	174	205	188	85.1	78.0	89.9	53,499	55,756	60,497	147	153	166	+ 8.5
District No. 1	.....	3,020	3,079	+ 2.0	.....	97	99	.....	143	123	.....	67.8	80.5	.....	35,049	35,980	.....	96	99	+ 3.1
District No. 2	.....	1,940	2,172	+ 12.0	.....	63	70	.....	62	65	.....	101.6	107.7	.....	20,707	24,517	.....	57	67	+ 17.5
Ill., Ind., Ky	22,078	23,710	26,393	+ 11.3	712	765	851	776	870	949	91.8	87.9	89.7	251,257	279,810	300,507	688	767	823	+ 7.3
Okla., Kan., Mo.	10,711	11,887	13,822	+ 16.3	346	383	446	418	469	454	83.3	81.7	98.2	127,130	138,385	153,741	348	379	421	+ 11.1
Texas Inland	5,761	6,689	7,810	+ 16.8	186	216	252	265	330	290	70.2	65.5	86.9	66,640	78,812	84,470	183	216	231	+ 6.9
Texas Gulf	33,919	36,246	41,624	+ 14.8	1,094	1,169	1,343	1,117	1,227	1,310	97.9	95.4	102.5	363,252	424,619	437,245	995	1,163	1,198	+ 3.0
Louisiana Gulf	4,925	10,648	12,421	+ 16.7	159	344	401	172	321	352	92.4	107.2	113.9	54,300	121,215	139,883	149	332	383	+ 15.4
Ark., and La. Inland	2,613	1,933	2,456	+ 27.1	84	62	79	97	126	113	86.6	49.2	69.9	29,365	21,967	24,705	80	60	68	+ 13.3
Rocky Mountains	2,848	4,207	4,732	+ 12.5	92	136	153	137	178	183	67.2	76.4	83.6	33,570	48,044	52,254	92	131	143	+ 9.2
District No. 3	.....	332	323	— 2.7	.....	11	11	.....	13	13	.....	84.6	84.6	.....	4,034	3,770	.....	11	10	— 9.1
District No. 4	.....	3,875	4,409	+ 13.8	.....	125	142	.....	165	170	.....	75.8	83.5	.....	44,010	48,484	.....	120	133	+ 10.8
California	17,805	24,548	25,171	+ 2.5	574	792	812	787	994	1,013	72.9	79.6	80.2	213,133	284,938	300,250	584	781	823	+ 5.4
Total United States	124,985	148,171	165,037	+ 11.4	4,032	4,780	5,324	4,647	5,559	5,671	86.8	86.0	93.9	1,409,192	1,730,197	1,849,931	3,861	4,740	5,068	+ 6.9

Drilling Depth Records in U. S., by States and Districts

State or District	Feet	Year	Formation	Well Location and Remarks
Oklahoma	17,823	1947	Pennsylvanian	Superior Oil Company of California's Weller 51-11, Caddo County. World's deepest.
California	17,696	1947	.....	Standard Oil Company of California's Maxwell 1, Sect 23-2n-23w, Ventura County. Still Drilling.
Upper Texas Coast	16,655	1945	L. Cretaceous	Phillips Petroleum Company's Schoeps 3, Millican salt dome area, Brazos County.
Lower Texas Coast	16,006	1947	Frio	The Texas Company's Yturria L & L Co. 6, Raymonville area, Willacy County.
Mississippi	15,730	1947	.....	Superior Oil Company of California's Cassie Bradford 1, Sect. 1-3n-13w, Forrest County.
South Louisiana	15,523	1947	Miocene	The Texas Company's LaFourche Basin Levee District 1, Queen Bess Island field, Jefferson Parish.
Florida	15,455	1947	.....	Gulf Refining Company's State of Florida 1, Big Pine Key area, Monroe County.
Southwest Texas	15,301	1045	L. Cretaceous	Quintana Petroleum Company's South Texas Syndicate 3-D, McMullen County.
West Texas	15,279	1944	Ellenburger	Phillips Petroleum Company's Ada Price 1, T. C. Railway survey, Pecos County.
New Mexico	13,998	1945	Ordovician	Phillips Petroleum Company's State-Lea-Mex. 4, Maljamar area, Lea County.
East Texas	13,781	1946	Cotton Valley	Phillips Petroleum Company's Englander 1, Don T. Quevado survey, Smith County.
North Texas	13,352	1947	Simpson	Denver Producing & Refining Company's Rich 1, Grayson County.
Wyoming	13,063	1947	Dakota	Mountain Fuel Supply Company's Unit 3, Church Butte field, Uinta County.
North Louisiana	12,952	1942	Smackover	Union Producing Company's McDonald Unit 1, North Lisbon field, Caliborne Parish.
Colorado	12,702	1945	Mississippian	The Texas Company-California Company's Unit 20, Wilson Creek field, Rio Blanco County.
Alabama	12,399	1941	Jurassic	Union Producing Company's M. M. Waite 1, Sect. 27-8n-1e, Clarke County.
East Texas Border	12,221	1946	Smackover	Humble Oil & Refining Company's Pickering Lumber Co. 1, Huxley field, Shelby County.
Utah	12,146	1947	Coconino	Pacific Western Oil Corporation's Unit 1, Gordon Creek structure, Carbon County. Still Drilling.
South Central Texas	11,951	1947	Schist	Magnolia Petroleum Company's Wm. McKinley 1, Frio County.
Texas Panhandle	11,737	1947	.....	Phillips Petroleum Company's Jenke 1, Roberts County. Still Drilling.
Arkansas	11,137	1944	Eagle Mills	Union Producing Company's Crossett Lumber Co. E-1, Sect. 12-19-7, Ashley County.
Washington	11,002	1947	.....	Standard Oil Company of California's Alderwood Comm. 1, Snohomish County.
Michigan	10,665	1947	.....	Ohio Oil Company-Pure Oil Company's Reinhardt 1, West Branch field, Ogemaw County. Still Drilling.
North Dakota	10,281	1938	Devonian	California Company's Kamp 1, Nesson Anticline, Williams County.
Montana	10,102	1946	Madison	Carter Oil Company-Phillips Petroleum Company's Weaselhead-Allot 1, Browning area, Glacier County.
Pennsylvania	10,096	1944	U. Cambrian	Manufacturers Light & Heat Company's Hockenberry 1, Mercer Township, Butler County. World's deepest cable tool well.
North Carolina	10,054	1946	Basement Rocks	Standard Oil Company of New Jersey's Cape Hatteras 1, Dare County.
West Virginia	10,018	1941	Queenston	Hope Natural Gas Company's Gribble 1, Grant District, Harrison County.
New York	8,626	1944	Ordovician	New Penn Development Company's Harrington 1, Woodhull Township, Steuben County.
Kansas	8,243	1947	.....	Stanolind Oil & Gas Company's Feathers 1, Seward County.
Maryland	8,165	1941	Helderburg	William Snee's Schartzer 1, Accident District, Garrett County.
West Central Texas	7,980	1945	Ellenburger	Humble Oil & Refining Company's C. H. Tompkins 1, T & P Railway survey 169, Parker County.
South Dakota	7,980	1943	Ordovician	Northern Ordnance Company, Inc.'s Harding County School Lands 1, Camp Cook Anticline, Harding County
Ohio	7,889	1933	Clinton	Sylvania Production Company's Knowlton 1, Independence Township, Washington County.
Georgia	7,490	1944	Cretaceous	Stanolind Oil & Gas Company's J. H. Pullen 1, Mitchell County.
Illinois	7,207	1940	St. Peter	Pure Oil Company's Billington 3, Sect. 26-1n-7e, Cisne field, Wayne County.
Oregon	6,939	1944	Basalt	Phillips Petroleum Company's well, near Coos Bay, Coos County.
Nebraska	6,846	1938	Pennsylvanian	Union Oil Company of California's Agate 15, Sioux County.
Indiana	6,408	1946	Trenton	Continental Oil Company's Cooper 1-D, Section 13-3s-14w, Gibson County.
Western Kentucky	6,117	1946	Granite	California Oil Company's Spears 1, Section 13-L-57, Lincoln County.
Tennessee	5,750	1947	Granite	Standard Oil Company of California's E. W. Beeler 1, Sect. 4-15s-29e, Giles County.
Eastern Kentucky	5,743	....	Red Medina	Columbian Fuel Corporation's Ford Motor Company 1, Pike County.
Iowa	5,305	1930	Cambrian	Oil Development Company's Wilson 1, Page County.
Arizona	4,970	1946	Gila	J. A. Robertson's Robertson 2, Maricopa County.
Missouri	4,740	1941	Cambrian	Strake Petroleum Company's T. P. Russell 1, Pemiscot County.

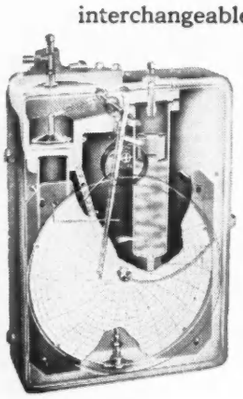
SIMPLIFIED DESIGN FOR ACCURATE LOW-COST OPERATION

As petroleum refining progressed from straight run processes through all the intricacies of modern refining methods METRIC American Orifice Meters have kept pace. They meet—and in many cases exceed—demands for accuracy and low-cost operation under tough conditions.

There are few moving parts, simply designed, interchangeable, easily replaced—only *one* between the surface of mercury and chart record.

Adjustment is easy—needing only screw driver, wrench and pliers. Every part is readily accessible. Cleaning does not interfere with operation.

The world over, experienced metric engineers acknowledge the ruggedness and dependability of METRIC American Meters.



Technical literature, on Indicating, Recording or Integrating Flowmeters, Pressure Regulators, Liquid Level and Flow Controllers will be mailed on request.

AMERICAN METER COMPANY

INCORPORATED (ESTABLISHED 1836)

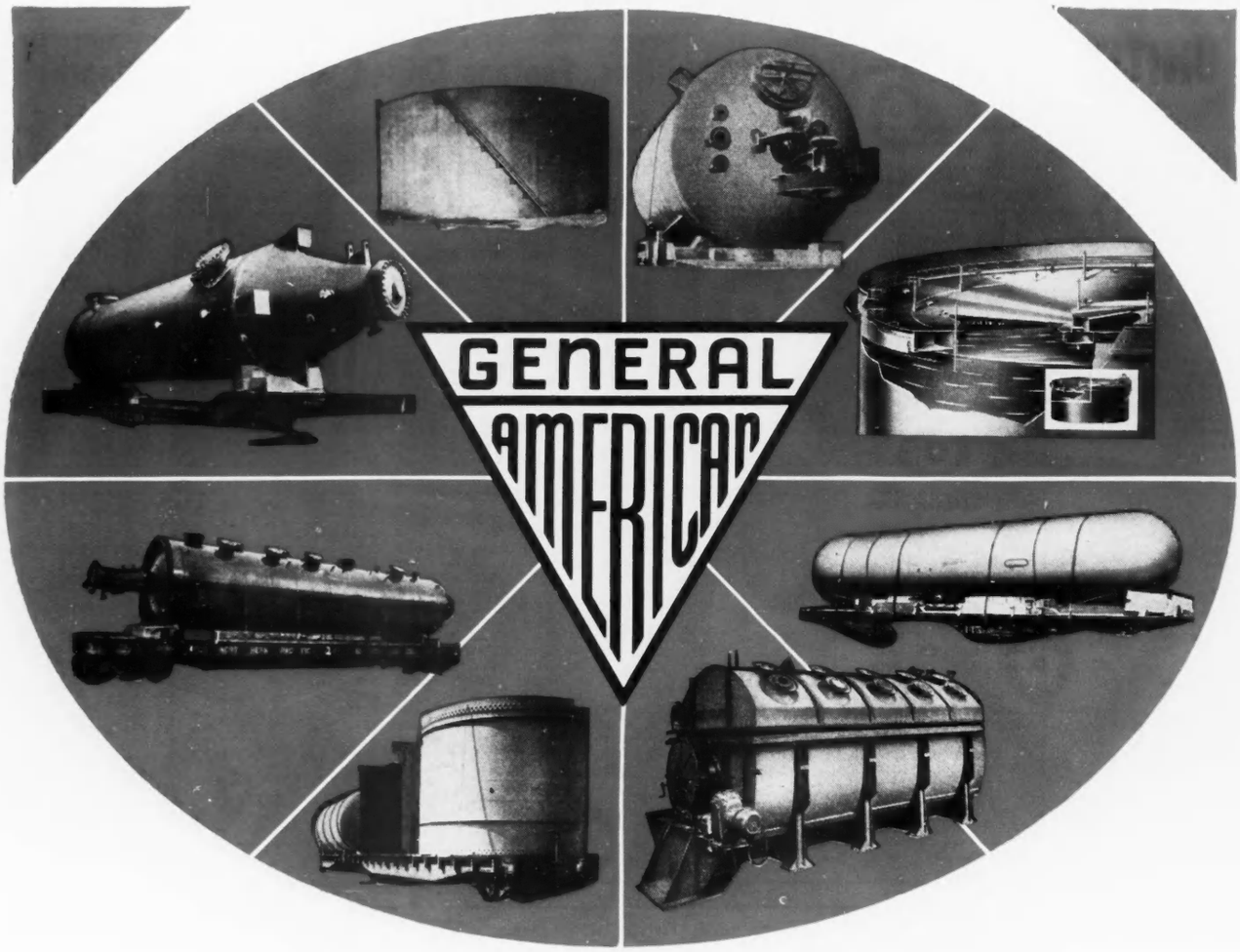
Albany • Atlanta • Baltimore • Birmingham • Boston
Chicago • Dallas • Denver • Erie • Houston • Joliet
Kansas City • Los Angeles • New York • Orlando
Philadelphia • Pittsburgh • San Francisco • Tulsa

UNITED STATES—1947 Completions, Footage Drilled, and Average Depths

STATE OR DISTRICT	OIL			DISTILLATE			GAS			DRY			WATER INPUT			GAS INPUT		
	Wells	Footage	Avg. Depth	Wells	Footage	Avg. Depth	Wells	Footage	Avg. Depth	Wells	Footage	Avg. Depth	Wells	Footage	Avg. Depth	Wells	Footage	Avg. Depth
Alabama	6	20,596	3433							24	112,325	4680						
Arkansas	174	716,453	4118	4	30,421	7605	7	25,568	3653	141	569,762	4041						
California	1554	6,400,996	4119				46	177,003	3848	355	1,513,797	4264						
Colorado	156	994,338	6374				8	16,366	2046	45	149,136	3314						
Florida	2	23,151	11576							27	129,794	4807						
Georgia										5	18,770	3754						
Illinois	1071	2,852,077	2663				9	13,805	1534	966	2,420,867	2506						
Indiana	291	523,556	1799				26	29,210	1123	310	560,918	1809						
Kansas	1287	4,210,346	3271				436	1,235,344	2833	832	2,856,931	3434				1	3,508	3508
Kentucky	293	491,743	1678				294	621,944	2115	272	552,959	2033						
Louisiana	924	4,404,418	4767	86	814,472	9471	93	355,575	3823	548	3,113,434	5681	1	9,040	9040	1	8,541	8541
North Louisiana	547	1,212,718	2217	31	256,366	8270	83	275,874	3324	352	1,288,673	3661	1	9,040	9040			
South Louisiana	377	3,191,700	8466	55	558,106	10147	10	79,701	7970	196	1,824,761	9310				1	8,541	8541
Michigan	320	790,843	2471				47	83,582	1778	349	787,003	2255						
Mississippi	290	2,569,381	8860	18	149,351	8297	24	194,988	8125	136	1,027,056	7551						
Missouri	7	2,057	294				9	3,039	377	27	17,770	658						
Montana	150	335,539	2237				26	63,170	2430	63	153,174	2431						
Nebraska										3	7,987	2662						
New Mexico	397	1,895,421	4774	1	9,152	9152	61	176,552	2894	102	340,086	3334						
New York	1119	1,546,615	1382				11	42,376	3852	11	46,750	4250	722	1,007,022	1395			
North Carolina										1	6,370	6370						
Ohio	307	713,689	2325				557	1,817,987	3264	458	1,209,624	2641						
Oklahoma	1964	6,280,456	3198	5	29,758	5952	188	593,978	3159	1404	4,407,782	3139				23	36,312	1579
Oregon										1	8,500	8500						
Pennsylvania	1269	2,039,295	1607				602	1,314,107	2183	228	480,580	2108	1065	1,707,195	1603	285	456,855	1603
Tennessee	2	3,065	1533							19	30,096	1584						
Texas	5617	25,047,179	4459	167	1,361,262	8151	487	2,191,210	4499	2984	12,040,744	4035	10	8,515	852	7	15,346	2192
Dist. 1—S. Central	176	768,040	4364				9	42,572	4730	181	495,177	2736						
Dist. 2—Middle Gulf	358	2,173,611	6071	44	334,931	7612	41	213,670	5211	177	1,064,751	6015						
Dist. 3—Upper Gulf	447	2,626,984	5877	63	558,324	8862	42	257,973	6142	320	2,182,805	6821						
Dist. 4—L. Gulf-S.W.	582	3,266,602	5613	45	356,749	7928	62	318,895	5143	419	1,987,963	4745				1	4,234	4234
Dist. 5—East Central	60	341,993	5700	1	5,821	5821	14	102,036	7288	90	365,322	4059						
Dist. 6—Northeast	285	1,332,201	4674	11	92,077	8371	75	497,803	6637	115	602,838	5242						
Dist. 7-B—North Central	385	1,199,673	3116	1	3,750	3750	32	100,593	3144	470	1,432,006	3047						
Dist. 7-C—West Central	202	633,281	3135				4	17,206	4302	69	317,330	4599						
Dist. 8—West	1696	8,395,639	4950				15	52,183	3479	241	1,203,540	4994						
Dist. 9—North	1133	3,270,930	2887	2	9,610	4805	16	50,847	3178	834	2,043,004	2450	10	8,515	852	6	11,112	1852
Dist. 10—Panhandle	293	1,038,225	3543				177	537,432	3036	68	346,008	5088						
Utah										4	20,155	5039						
Washington										2	15,321	7660						
West Virginia	108	192,446	1782				582	1,717,721	2951	154	451,723	2933	1	3,204	3204			
Wyoming	170	748,112	4401	2	25,755	12877	13	75,579	5814	75	337,191	4496						
Total United States	17,478	62,801,772	3593	283	2,420,171	8552	3526	10,749,104	3049	9546	33,386,605	3497	1799	2,734,976	1520	317	520,562	1642

STATE OR DISTRICT	SALT WATER DISPOSAL			TOTAL NEW WELLS (Preceding Classes)						OLD WELLS DRILLED DEEPER, 1947 (Productive and Dry)			TOTAL ALL WELLS					
				1947			1946						1947			1946		
	Wells	Footage	Avg. Depth	Wells	Footage	Avg. Depth	Wells	Footage	Avg. Depth	Wells	Footage	Avg. Depth	Wells	Footage	Avg. Depth	Wells	Footage	Avg. Depth
Alabama				30	132,921	4431	17	69,381	4081				30	132,921	4431	17	69,381	4081
Arizona							2	6,259	3129							2	6,259	3129
Arkansas				326	1,342,204	4117	201	794,842	3955	4	1,354	338	330	1,343,558	4071	203	795,012	3916
California				1955	8,091,796	4139	1823	7,763,246	4258	28	29,700	1061	1983	8,121,496	4096	1897	7,860,125	4143
Colorado				209	1,159,840	5549	176	1,115,503	6338	2	3,130	1515	211	1,162,970	5512	176	1,115,503	6338
Florida				29	152,945	5274	27	178,378	6606				29	152,945	5274	27	178,378	6607
Georgia				5	18,770	3754	2	8,441	4220				5	18,770	3754	2	8,441	4221
Illinois				2046	5,286,749	2584	2342	5,936,676	2535	17	6,460	380	2063	5,293,209	2566	2379	5,948,579	2500
Indiana				627	1,113,684	1776	512	917,820	1793	4	432	108	631	1,114,116	1766	522	922,836	1768
Kansas	25	86,406	3456	2581	8,392,535	3252	2127	6,900,446	3244	69	17,523	254	2650	8,419,058	3174	2221	6,919,938	3116
Kentucky	2	4,701	2350	861	1,671,347	1941	950	1,713,718	1804	3	1,060	353	864	1,672,407	1936	955	1,715,987	1797
Louisiana	6	17,190	2865	1659	8,722,670	5258	1418	8,755,279	6174	8	14,421	1803	1667	8,737,091	5241	1422	8,762,668	6162
North Louisiana	5	8,586	1717	1019	3,051,257	2994	807	3,247,347	4024	4	12,531	3133	1023	3,063,788	2995	810	3,252,786	4016
South Louisiana	1	8,604	8604	640	5,671,413	8862	611	5,507,932	9015	4	1,890	473	644	5,673,303	8809	612	5,509,882	9003
Maryland							1	7,710	7710							1	7,710	7710
Michigan				716	1,661,428	2320	781	1,753,591	2245	2	760	380	718	1,662,188	2315	785	1,756,718	2238
Mississippi				468	3,940,776	8420	263	1,952,981	7426	2	1,404	702	470	3,942,180	8388	266	1,953,902	7345
Missouri				43	22,866	532	34	27,567	811				43	22,866	532	34	27,567	811
Montana				239	551,883	2309	258	622,433	2413	3	1,058	353	242	552,941	2285	263	623,668	2371
Nebraska				3	7,987	2662	5	12,799	2560				3	7,987	2662	5	12,799	2560
New Mexico				561	2,421,211	4316	442	1,723,189	3899	46	91,805	1996	607	2,513,016	4140	463	1,761,560	3805
New York				1863	2,642,763	1419	1501	2,175,214	1449				1863	2,742,763	1419	1501	2,175,214	1449
North Carolina				1	6,370	6370	5	26,173	5235				1	6,370	6370	5	26,173	5235
Nevada							1	3,750	3750							1	3,750	3750
Ohio				1322	3,741,300	2830	1313	3,398,593	2588	25	19,412	776	1347	3,760,712	2792	1326	3,407,177	2570
Oklahoma	4	10,650	2662	3588	11,358,936	3166	3179	10,157,733	3195	119	47,677	401	3707	11,406,613	3077	3301	10,201,937	3091
Oregon				1	8,500	8500	2	17,148	8574				1	8,500	8500	2	17,148	8574
Pennsylvania				3449	5,998,032	1739	3645	6,322,572	1735	39	46,968	1204	3488	6,045,000	1733	3685	6,363,625	1727
South Dakota							3	8,038	2679							3	8,038	2679
Tennessee				21	33,161	1579	18	17,371	965				21	33,161	1579	18	17,371	965
Texas	9	16,707	1856	9281	40,680,963	4383	8226	35,848,363	4358	237	167,858	708	9518	40,848,821	4292	8382	35,923,614	4286
Dist. 1—S. Central				366	1,305,789	3568	183	667,913	3650	5	2,984	597	371	1,308,773	3528	183	667,913	3650
Dist. 2—Middle Gulf				620	3,786,963	6108	[1]	[1]	[1]	9	17,087	1898	629	3,804,050	6048	[1]	[1]	[1]
Dist. 3—Upper Gulf				872	5,626,086	6452	680	4,910,901	7222	5	6,598	1319	877	5,632,684	6423	680	4,910,901	7222
Dist. 4—L. Gulf-S.W.				1109	5,934,443	5351	1576	8,763,990	5561	28	28,117	1004	1137	5,962,560	5244	1605	8,793,197	5479
Dist. 5—East Central	1	4,578	4578	166	819,750	4938	[2]	[2]	[2]	1	1,425	1425	167	821,175	4917	[2]	[2]	[2]
Dist. 6—Northeast	2	5,161	2580	488	2,530,080	5185	714	3,810,251	5336	5	3,743	749	493	2,533,823	5140	718	3,815,339	5314
Dist. 7-B—N. Central				888	2,736,022	3081	[3]	[3]	[3]	22	19,926	906	910	2,775,948	3029	[3]	[3]	[3]
Dist. 7-C—West Central				275	967,817	3519	[4]	[4]	[4]	13	13,774	1059	288	981,591	3408	[4]	[4]	[4]
Dist. 8—West				1952	9,651,362	4944	1825	9,043,573	4955	90	49,358	548	2042	9,700,720	4751	1870	9,058,755	4844
Dist. 9—North	6	6,968	1161	2007	5,400,986	2691	2908	7,611,271	2617	52	24,278	467	2059	5,425,264	2635	2958	7,634,956	2581
Dist. 10—Panhandle				538	1,921,665	3572	340	1,040,464	3060	7	568	81	545	1,922,233	3527	368	1,042,553	2833
Utah				4	20,155	5039	9	21,303	2367				4	20,155	5039	9	21,303	2367
Virginia							2	5,370	2685							2	5,370	2685
Washington				2	15,321	7660	1	6,230	6230				2	15,321	7660	1	6,230	6230
West Virginia				845	2,365,094	2799	781	2,177,906	2789	35	8,527	244	880	2,373,621	2697	806	2,190,187	2717
Wyoming				260	1,186,637	4564	163	678,790	4164	8	3,773	472	268	1,190,410	4442	163	678,790	4164
Total United States	46	135,654	2949	32,995	112,748,844	3417	30,230	101,124,813	3345	651	463,322	712	33,646	113,212,166	3365	30,845	101,492,958	3290

[1] Dist. 2 included with Dist. 4. [2] Dist. 5 included with Dist. 6. [3] Dist. 7-B included with Dist. 9. [4] Dist. 7-C included with Dist. 8.



Specific jobs for Refiners

Other General American Equipment

TANKS . . .

Crude • Gasoline
Propane • Butane
Chlorine • Acid
Blending • Mixing
Water

TOWERS

Absorber • Flash
Bubble • Pressure
Vacuum • Fractionating

DEWAXING FILTERS
STACKS • BINS
STEEL & ALLOY PLATE FABRICATION
WIGGINS CONSERVATION STRUCTURES

Call for a knowledge of petro-chemical processes, operating conditions, safety requirements and the need for dependable trouble-free performance.

For years, General American has fabricated special equipment for refiners, designed on sound engineering principles, built with painstaking attention to details and from materials selected to meet operating conditions.

On your next plate fabricating job, ask a General American engineer to work with you.

GENERAL AMERICAN TRANSPORTATION CORPORATION

PLATE & WELDING DIVISION
GENERAL AMERICAN
TRADE MARK

SALES OFFICE: 10 East 49th St., Dept. R, New York 17, N. Y.

WORKS: Sharon, Pa., East Chicago, Ind.

OFFICES: Chicago, Cleveland, Louisville, Orlando, Pittsburgh, St. Louis, Salt Lake City, Sharon, Washington, D. C.

UNITED STATES—Exploratory Drilling Results in 1947

(Based on Data Compiled by the Staff of World Oil)

PART 1: Productive Tests

State or District	OIL									DISTILLATE									GAS									TOTAL PRODUCTIVE		
	New Fields			New Pays			Extensions			New Fields			New Pays			Extensions			New Fields			New Pays			Extensions					
	No.	Footage	Avg. Depth	No.	Footage	Avg. Depth	No.	Footage	Avg. Depth	No.	Footage	Avg. Depth	No.	Footage	Avg. Depth	No.	Footage	Avg. Depth	No.	Footage	Avg. Depth	No.	Footage	Avg. Depth	No.	Footage	Avg. Depth	No.	Footage	Avg. Depth
Alabama																														
Arkansas	5	24,690	4938	4	15,550	3887	1	3,142	3142	..	..	..	2	15,581	7791	..	..	..										12	58,963	4913
California	10	61,742	6174	11	78,778	7161	7	31,769	4538	..	..	..	..	..	..	..	..	..	1	4,904	4904	..	..	..	3	7,776	2592	32	184,969	5780
Colorado	2	6,821	3411	..	..	..	1	5,225	5225	..	..	..	..	..	..	..	..	..	1	410	410	..	..	..	3	7,175	2391	7	19,631	2804
Florida																														
Georgia																														
Illinois	28	76,886	2746	62	169,322	2731	52	147,942	2845	..	..	..	..	..	..	..	..	..				1	1,336	1336	1	2,331	2331	144	397,817	2762
Indiana	15	26,284	1752	8	15,389	1923	1	1,675	1675	..	..	..	..	..	..	..	..	..	1	2,404	2404	..	..	..	..	..	..	25	45,752	1830
Kansas	58	190,990	3292	..	..	..	2	7,223	3611	..	..	..	..	..	..	..	..	..	12	47,371	3948	..	..	..	1	8,243	8243	73	253,827	3477
Kentucky	5	8,844	1768	1	17,82	1782	2	3,737	1868	..	..	..	..	..	..	..	..	..				..	..	..	..	..	..	8	14,363	1795
Louisiana	18	145,100	8061	32	275,110	8597	4	23,751	5937	9	88,643	9850	19	205,784	10831	2	17,882	8941	4	36,804	9201	..	..	..	..	..	..	88	793,074	9012
North Louisiana	7	40,749	5821	2	8,570	4285	1	2,565	2565	3	23,845	7948	1	5,384	5384	2	17,882	8941	1	3,405	3405	..	..	..	..	..	..	17	102,400	6023
South Louisiana	11	104,351	9486	30	266,540	8884	3	21,186	7062	6	64,798	10799	18	200,400	11133	..	..	..	3	33,399	11133	..	..	..	..	..	..	71	690,674	9727
Michigan	10	25,379	2537	..	..	..	6	14,445	2407	..	..	..	..	..	..	..	..	..	4	8,812	2203	1	1,452	1452	..	..	..	21	50,088	2385
Mississippi	5	41,839	8367	1	6,275	6275	3	27,135	9045	..	..	..	1	6,680	6680	1	6,676	6676	1	2,225	2225	..	..	..	..	..	..	12	90,830	7569
Missouri																														
Montana	1	6,795	6795	1	3,451	3451	2	4,838	2419	..	..	..	..	..	..	..	..	..	1	4,977	4977	1	2,857	2857	..	..	..	6	22,918	3819
Nebraska																														
New Mexico	6	22,979	3830	3	18,413	6137	2	13,384	6692	..	..	..	1	9,152	9152	..	..	..				..	..	..	1	9,247	9247	13	73,175	5628
North Carolina																														
Ohio																			3	10,588	3529	..	..	..	9	31,258	3473	12	41,846	3487
Oklahoma	77	383,538	4981	4	11,565	2891	5	22,859	4571	2	9,213	4606	..	..	..	..	..	..	18	71,299	3961	..	..	..	1	8,447	8447	107	506,921	4737
Oregon																														
Pennsylvania																														
Tennessee																														
Texas	176	911,111	5176	161	939,352	5834	53	293,645	5540	33	254,835	7722	31	267,915	8643	12	85,945	7162	37	169,029	4568	26	165,284	6357	9	64,270	7141	538	3,151,386	5857
Dist. 1: S. Central	9	26,883	2987	1	4,084	4084	4	21,001	5250																			14	51,968	3712
Dist. 2: Middle Gulf	8	62,306	7788	12	83,948	6995	3	23,306	7768	14	117,687	8406	9	66,398	7378	1	7,852	7852	7	40,050	5721	7	35,250	5035	2	12,254	6127	63	449,051	7127
Dist. 3: Upper Gulf	16	127,219	7945	25	176,606	7064	4	26,544	6636	9	71,765	7973	10	91,378	9138	3	23,967	7989	6	41,685	6948	8	56,148	7018				81	615,312	7596
Dist. 4: L.Gulf-S.W.	26	154,083	5926	47	293,143	6237	4	19,651	4912	6	35,299	5883	10	85,269	8527	6	43,149	7192	12	42,581	3548	9	62,095	6899	2	14,455	7227	122	749,725	6145
Dist. 5: East Cent.	5	13,784	2756	3	9,752	3250	2	17,823	8911																2	22,499	11249	12	63,858	5321
Dist. 6: Northeast	4	31,083	7770	4	24,426	6106	1	4,725	4725	3	26,334	8778	2	24,870	12435	1	6,264	6204	2	16,267	8134				1	6,115	6115	18	140,024	7779
Dist. 7-B: N. Cent.	40	150,394	3759	24	88,181	3674	1	3,115	3115	1	3,750	3750	..	..	..	..	..	..	7	19,654	2808							73	265,094	3631
Dist. 7-C: W. Cent.	18	70,132	3896	3	14,191	4730	4	13,349	3337																1	6,270	6270	26	103,942	3997
Dist. 8: West	22	151,083	6867	17	141,262	8309	21	122,580	5837	..	..	..	..	..	..	..	..	..	1	3,380	3380	2	11,791	5895	..	..	..	63	430,096	6826
Dist. 9: North	27	117,152	4338	25	103,759	4150	9	41,551	4661	..	..	..	..	..	..	1	4,773	4773	2	5,412	2706	..	..	..	..	..	..	64	272,647	4260
Dist. 10: Panhandle	1	6,992	6992	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2,677	2677	2	9,669	4834
Utah																														
Washington																														
West Virginia																			3	5,991	1997							3	5,991	1997
Wyoming	8	47,770	5971	5	15,963	3192	11	61,411	5583							2	25,755	12878	2	16,125	8062				1	3,950	3950	29	170,974	5895
U. S. Total, 1947	424	1,980,768	4672	293	1,550,950	5293	152	662,181	4356	44	352,691	8016	54	505,112	9354	17	136,258	8015	88	380,939	4328	29	170,929	5894	29	142,697	4920	1130	5,882,525	5205
U. S. Total, Earlier Years																														
1946	308	1,359,787	4415	205	1,227,305	5987	160	707,585	4422	29	264,441	9119	42	411,425	9796	7	63,111	9016	75	272,564	3634	29	166,588	5744	115	406,774	3537	970	4,879,580	5030
1945	317	1,503,763	4774	158	894,688	5663	154	702,822	4564	30	269,915	8997	14	140,464	10033	6	54,162	9027	113	486,529	4306	15	67,455	4497	70	216,103	3087	877	4,335,901	4944
1944	326	1,422,250	4363	149	731,764	4911	135	659,987	4889	32	250,228	7820	9	75,436	8382	10	79,797	7980	102	417,944	4097	15	95,099	6340	27	111,174	4118	805	3,843,679	4775
1943	276	1,232,396	4465	127	565,454	4452	132	559,090	4236	15	140,564	9371	9	88,031	9781	3	25,589	8530	56	212,814	3800	16	90,372	5648	10	58,996	8530	644	2,973,306	4617
1942	288	1,199,382	4165	163	879,116	5393				13	121,620	9355	2	13,517	6759				48	167,428	3562	10	50,712	5071				524	2,431,775	4650
1941	301	1,165,966	3874	261	1,335,648	5117				3	23,505	7835	2	7,109	3555				58	177,974	3069	25	89,263	3571				650	2,799,465	4307
1940	262	957,167	3667	167	914,442	5476				2	12,792	6396							46	122,439	2662	16	55,983	3499				493	2,062,823	4193
1939	224	782,289	3492	190	998,595	5256				1	7,999	7999	3	24,709	8236				33	103,450	3135	22	92,626	4210				473	2,009,668	4249
1938	229	944,455	4124	144	815,186	5661	7	25,027	3575	4	23,657	5914	4	27,115	6779				31	102,440	3350	11	49,634	4512	3	12,042	4014	433	1,999,556	4618
1937	203	831,123	4094	119	615,007	5168	3	9,036	3012	3	19,377	6459	3	24,574	8191	..	..	..	33	77,389	2345	15	51,145	3410	..	..	..	379	1,627,651	4295

■ CONTINUED ON PAGE 111

PETRECO *Electric* PROCESSES

	BENEFIT ALL DEPARTMENTS	STEP UP EFFICIENCY	INCREASE PROFITS
DEHYDRATING — *Production*	*Lowest Cuts, plus Automatic Operation In Vapor tight tanks*		*Maximum volume for sales in highest gravity bracket*
DEHYDRATING — *Transportation*	*Minimum B.S. & W. Maximum Pipe Line and Storage Capacity*		*Lower viscosities for easier pumping. Minimum bottoms*
DESALTING — *Refining*	*Stops salt plugging Retards hard coke formation Reduces HCl corrosion*		*More time on stream Fewer shutdowns Increased refining capacity*
DESALTING — *Marketing*	*Improved asphalts Better kerosenes Cleaner fuel oils*		*Better products Easier selling Broader market*

In addition to the advantages listed above, the Petreco *Electric* Processes are backed by skilled SERVICE, complete REPLACEMENT STOCKS, a continuing RESEARCH and DEVELOPMENT PROGRAM and the KNOW HOW gained from many years of DEHYDRATING and DESALTING EXPERIENCE.

PETROLEUM RECTIFYING COMPANY
5121 South Wayside Drive, Houston 1, Texas
648 Edison Building, Toledo 4, Ohio
530 West Sixth Street, Los Angeles 14, Calif.

PETRECO

SPECIALIZED *Electric* PETROLEUM PROCESSES { DESALTING / DEHYDRATING

PR-48-5

UNITED STATES—Exploratory Drilling Results in 1947—Continued

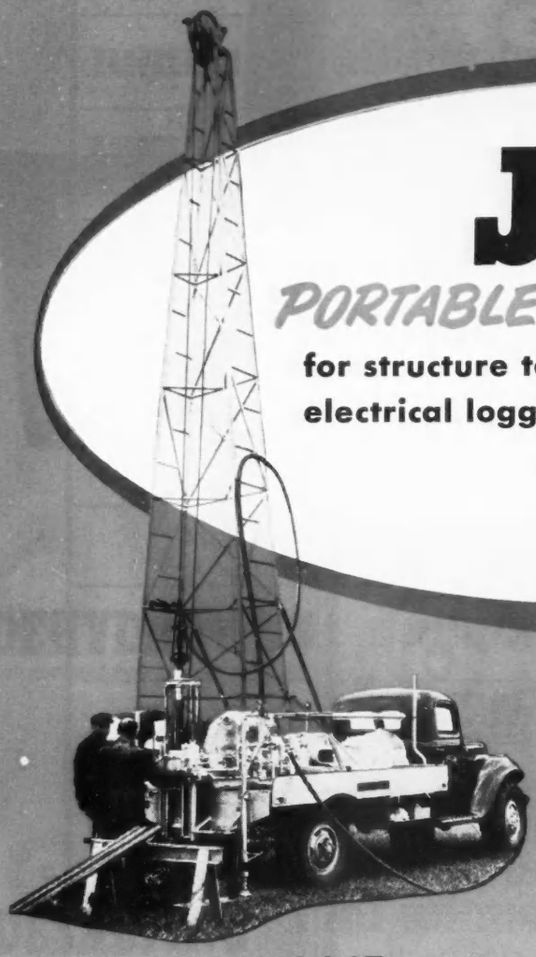
STATE OR DISTRICT	DRY WILDCATS			DRY NEW PAY TESTS			DRY OUTPOSTS			TOTAL DRY			TOTAL EXPLORATORY TESTS		
	No.	Footage	Average Depth	No.	Footage	Average Depth	No.	Footage	Average Depth	No.	Footage	Average Depth	No.	Footage	Average Depth
Alabama	24	112,325	4680	....	.....	....	....	.....	....	24	112,325	4680	24	112,325	4680
Arkansas	72	287,246	3989	1	3,160	3160	1	3,210	3210	74	293,616	3968	86	352,579	4100
California	269	1,184,250	4402	....	.....	....	....	.....	....	269	1,184,250	4402	301	1,369,219	4549
Colorado	37	106,110	2867	....	.....	....	7	39,303	5614	44	145,413	3305	51	165,044	3236
Florida	27	129,794	4807	....	.....	....	....	.....	....	27	129,794	4807	27	129,794	4807
Georgia	5	18,770	3754	....	.....	....	....	.....	....	5	18,770	3754	5	18,770	3754
Illinois	440	1,072,933	2438	....	.....	....	....	.....	....	440	1,072,933	2438	584	1,470,750	2518
Indiana	131	248,740	1899	....	.....	....	....	.....	....	131	248,740	1899	156	294,492	1888
Kansas	344	1,248,738	3630	....	.....	....	....	.....	....	344	1,248,738	3630	417	1,502,565	3603
Kentucky	63	153,943	2444	....	.....	....	....	.....	....	63	153,943	2444	71	168,306	2370
Louisiana	268	1,653,958	6171	6	42,427	7071	1	3,703	3703	275	1,700,088	6182	363	2,493,162	6868
North Louisiana	184	748,577	4068	5	29,421	5884	1	3,703	3703	190	781,701	4114	207	884,101	4271
South Louisiana	84	905,381	10778	1	13,006	13006	....	.....	....	85	918,387	10804	156	1,609,061	10314
Michigan	235	543,134	2311	1	5,090	5090	2	4,698	2349	238	552,922	2323	259	603,010	2328
Mississippi	88	609,971	6931	....	.....	....	....	.....	....	88	609,971	6931	100	700,801	7008
Missouri	18	14,111	784	....	.....	....	....	.....	....	18	14,111	784	18	14,111	784
Montana	18	46,200	2567	1	5,852	5852	2	4,854	2427	21	56,906	2710	27	79,824	2956
Nebraska	2	7,388	3694	....	.....	....	....	.....	....	2	7,388	3694	2	7,388	3694
New Mexico	60	199,572	3326	6	31,734	5289	....	.....	....	66	231,306	3505	79	304,481	3854
North Carolina	1	6,370	6370	....	.....	....	....	.....	....	1	6,370	6370	1	6,370	6370
Ohio	43	153,615	3572	....	.....	....	....	.....	....	43	153,615	3572	55	195,461	3554
Oklahoma	530	1,817,488	3429	....	.....	....	1	3,080	3080	531	1,820,568	3429	638	2,327,489	3648
Oregon	1	8,500	8500	....	.....	....	....	.....	....	1	8,500	8500	1	8,500	8500
Pennsylvania	7	25,368	3624	....	.....	....	....	.....	....	7	25,368	3624	7	25,368	3624
Tennessee	18	28,368	1576	....	.....	....	....	.....	....	18	28,368	1576	18	28,368	1576
Texas	1,537	6,871,421	4472	31	196,004	6323	47	287,372	6114	1,615	7,354,797	4554	2,153	10,506,183	4880
Dist. 1: South Central	143	389,499	2724	....	.....	....	1	9,012	9012	144	398,511	2767	158	450,479	2851
Dist. 2: Middle Gulf	115	718,636	6249	....	.....	....	8	53,116	6639	123	771,752	6274	186	1,220,803	6563
Dist. 3: Upper Gulf	173	1,317,053	7613	3	20,441	6813	11	80,351	7305	187	1,417,845	7582	268	2,033,157	7586
Dist. 4: Lower Gulf-Southwest	258	1,237,065	4795	2	13,401	6700	15	82,951	5530	275	1,333,417	4849	397	2,083,142	5247
Dist. 5: East Central	73	291,200	3989	2	14,508	7254	1	1,510	1510	76	307,218	4042	88	371,076	4217
Dist. 6: Northeast	56	313,463	5598	3	30,444	10148	2	14,216	7108	61	358,123	5871	79	498,147	6306
Dist. 7-B: North Central	249	783,666	3147	7	26,603	3800	1	4,400	4400	257	814,669	3170	330	1,079,763	3272
Dist. 7-C: West Central	40	205,532	5138	2	14,244	7122	1	4,081	4081	43	223,857	5206	69	327,799	4751
Dist. 8: West	127	730,769	5754	5	35,130	7026	5	29,615	5923	137	795,514	5807	200	1,225,610	6128
Dist. 9: North	283	752,467	2659	5	24,995	4999	2	8,120	4060	290	785,582	2709	354	1,058,229	2989
Dist. 10: Panhandle	20	132,071	6604	2	16,238	8119	....	.....	....	22	148,309	6741	24	157,978	6582
Utah	4	20,155	5039	....	.....	....	....	.....	....	4	20,155	5039	4	20,155	5039
Washington	2	15,321	7660	....	.....	....	....	.....	....	2	15,321	7660	2	15,321	7660
West Virginia	8	39,959	4995	....	.....	....	....	.....	....	8	39,959	4995	11	45,950	4177
Wyoming	38	175,465	4618	4	22,400	5600	8	33,419	4177	50	231,284	4626	79	402,258	5092
U. S. Total, 1947	4,290	16,799,213	3916	50	306,667	6133	69	379,639	5502	4,409	17,485,519	3966	5,539	23,368,044	4219
U. S. Total, Earlier Years															
1946	3,830	14,399,824	3760	38	274,592	7226	109	418,919	3843	3,977	15,093,335	3795	4,947	19,972,915	4037
1945	3,486	14,504,642	4161	39	284,441	7293	108	375,062	3473	3,633	15,164,145	4174	4,510	19,500,046	4324
1944	3,425	13,470,846	3933	22	141,039	6411	73	383,802	5258	3,520	13,995,687	3976	4,325	17,839,366	4125
1943	2,951	10,702,429	3627	....	.....	....	36	164,155	4560	2,987	10,866,584	3638	3,631	13,839,890	3812
1942	2,652	9,320,691	3515	....	.....	....	....	.....	....	2,652	9,320,691	3515	3,176	11,752,466	3702
1941	3,047	9,651,013	3167	....	.....	....	....	.....	....	3,047	9,651,013	3167	3,697	12,450,478	3368
1940	2,672	8,649,828	3237	....	.....	....	....	.....	....	2,672	8,649,828	3237	3,165	10,712,651	3386
1939	2,488	7,764,816	3121	....	.....	....	....	.....	....	2,488	7,764,816	3121	2,961	9,774,484	3301
1938	2,179	7,012,901	3218	....	.....	....	....	.....	....	2,179	7,012,901	3218	2,612	9,012,457	3450
1937	1,943	7,173,550	3692	....	.....	....	....	.....	....	1,943	7,173,550	3692	2,322	8,801,201	3790

DRILL MORE FOOTAGE in less time!

JOY

PORTABLE DRILLING RIGS

for structure testing . . . core drilling . . . electrical logging and shallow slim-hole production



Model 37
Drills Holes to 1200 Feet

A light, portable drilling rig for shot-hole drilling, shallow structure testing, and blast hole work. Equipped with hydraulic feeding mechanism for core testing and changeable to kelly drive for shot-hole drilling. Capacity 1200 ft. of 2" core or 850 feet of 6" hole.

Model 300 A
Drills Holes to 4000 Feet

A heavy-weight, portable drilling rig for slim-hole production drilling. A younger brother to the large oil field rotaries; arranged for truck mounting to speed up moves between drilling locations. Operates same as conventional rotary plus added features which include hydraulic make and break tongs. Capacity 50,000 lb. drilling string.

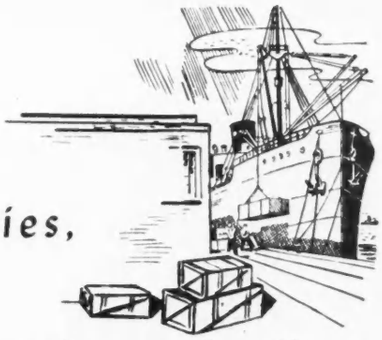
Consult a Joy Engineer ...or write for bulletins

W&D 011126 B

SULLIVAN DIVISION
JOY MANUFACTURING CO.
GENERAL OFFICES: HENRY W. OLIVER BUILDING, PITTSBURGH, PA.

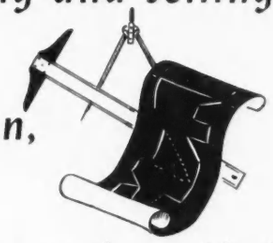
CENTRAL AMERICA

Q. *What one organization . . . .*

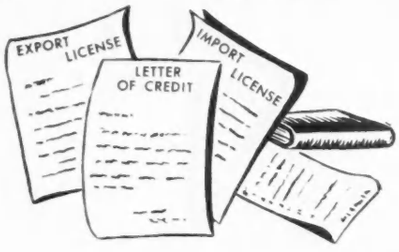


offers complete export crating facilities,

finances export-import buying and selling,

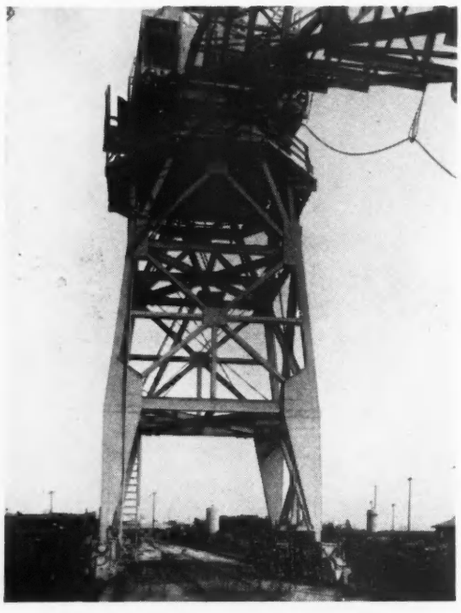


provides engineering, including packaging design,



handles complete paper details?

A. ***Western Wood Products Company*** **. . . through five subsidiary companies under its direction. Singly, or in combination, the facilities of these companies are available to business and industry . . . bringing new high standards of efficient, economical operation to the fields of buying, selling, and shipping in the foreign markets of the world.**



The Answers In Action

The giant monster, at left, is a bulky 142 ton Gantry Crane, shipyard traveling type, running on 24 foot gauge 105# rails.

The crane was in California, and was bought by a firm in Goose Creek, Texas. Our engineers tackled the problem, and decided to ship the crane by boat through the Panama Canal. In part, the operation involved: buying the crane; designing special crating for shipping; crating the crane; handling all papers connected with shipping; transporting all parts from Houston to Goose Creek; and final erection of the crane and all of its parts on the customer's site.

We assumed total responsibility for the whole operation, relieving our customer of all details. Our responsibility did not end until the crane was delivered and erected, and our customer satisfied.

This complete service, with undivided responsibility, can save you time and money. You can profitably use our knowledge, experience and facilities to help solve all of your shipping and export-import problems, whether it's a bulky 142-ton crane, or a pump valve. **For full information . . call . . wire . . cable, or write us today!**

WESTERN WOOD PRODUCTS *Company*

M & M Building • Houston 2, Texas • Cable Address WESWORLD

Orange Wood Products Company **SUBSIDIARY COMPANIES** **Western World Trading Company**
Western Chemical Products Company **Transoceanic Trading Co., Ltd., London, England**
Compania De Productos De Madero Del Oeste, De Cuba S.A., Havana, Cuba

CENTRAL AMERICA

CENTRAL America's oil activity during 1947 consisted chiefly of operations in Panama and Nicaragua, with some geological work being carried out in Guatemala.

Sinclair-Panama Oil Corporation, holder of a concession of 18,125,000 acres in Panama, has renewed activity started back in the early 1920's, and is conducting an extensive geological and geophysical survey in that country, inasmuch as its grant calls for a selection of acreage after three years of its 20-year option. The company, owned by Sinclair Oil Corporation and Cities Service Oil Company was not obligated to start actual drilling before the end of the first three years, but has already moved in a heavy diesel rig to drill a wildcat on Columbus Island 4 miles north of the town of Bocas del Toro. The well spudded in August and at the close of the year was drilling below 7600 feet. Slight showings had been found at shallow depths in wells in this area drilled between 1924-1928.

Gulf Oil Corporation and The Atlantic Refining Company continue exploration in the Punta Gorda area on the east coast of Nicaragua with their Twara 1, wildcat just south of the Punta Gorda 1 which had been abandoned in 1945 at 6735 feet. This test is being drilled following additional investigation of the area in the light of information obtained in Punta Gorda 1.

Guatemala's new oil law became known early in 1948, but as now written will do little to encourage development by outside capital. Conditions have been imposed which not only call for high rentals on concessions, but which call for exploratory concessions to go up for auction to highest bidders after the holder has completed preliminary prospecting. In addition exploitation by other than the State, Guatemalans or by Guatemalan companies whose capital is predominantly national, is forbidden through a provision which refers to the Constitution for authority.

Most promising oil region in Guatemala is the Peten area where three exploratory concessions are now in effect, totaling 3,840,000 acres.

Compañia Petroleo del Peten, S. A. composed of some Guatemalan citizens and three or four Americans holds 1,490,000 acres in several blocks north and west of Lake Flores.

Stapper and Osborn, S. A., a firm of Americans, has six blocks comprising nearly 2 million acres on which Sohio Oil Company is now doing exploratory work.

Dorion Brothers hold 350,000 acres, including Lake Golfete and some territory northwest of Lake Izabol.

Final disposition of this acreage is now somewhat doubtful in view of the surprising provisions of the new law. Originally intended to attract foreign capital, it is likely to have an opposite effect.

Wildcats Completed in Central America

Country, Company and Well	Year Completed	Total Depth (Feet)	Results
Costa Rica			
Costa Rica Oil Corporation's (Sinclair) Cahuita 1	1922	3862	Abandoned. Gas shows at 822 feet
Four shallow tests	1923	1400	All abandoned
Puerto Viejo	1923	2410	Abandoned
Nicaragua			
Gulf and Atlantic's Punta Gorda 1	1945	6735	Abandoned
Miquel d'Escato's Cayetano 1	....	500	Abandoned
Davis & Company's San Rafael 1	1935	3940	Abandoned
Panama			
Sinclair Panama Oil Corporation's Bocas del Toro 1	1922	1625	Abandoned, casing collapsed
Bocas del Toro 2	1922	3250	Abandoned
The Texas Company's David 1	1925	3862	Abandoned
Panama Gulf Oil Corporation's Garachine 1	1924	3250	Abandoned
Garachine 2	1924	3069	Abandoned. Slight oil shows
Garachine 3	1928	4986	Abandoned. Some gas shows
Sinclair Panama Oil Corporation's Yape 1	1927	3508	Abandoned
Capeti 1	1927	995	Abandoned
Capeti 2	1927	3000	Abandoned

BAHAMA ISLANDS

WITH completion of an extensive airborne Magnetometer survey of the entire Bahamas group during 1947, including the waters surrounding them, and the completion during 1947 of a deep wildcat which should furnish valuable stratigraphic information, it may be expected that 1948 will see the initiation of further activity in the area by the several companies which now hold exploration licenses from the British government.

The magnetometer survey employed the process developed during World War II, and was a joint venture in which all of the interested companies participated. Starting in May, the project was completed in December, covering more than 80,000 square miles at a cost of a million dollars. The seven participating companies were awaiting the full report, with accompanying maps, before laying plans for any continued operations. The area covered in the survey consists of approximately 10 percent land and 90 percent water, with fully 80 percent of the entire area covered by shallow water. Early reports by technicians on the project indicated that results were being obtained which were even better than those with the same instrument on land.

Anglo-Bahamian Petroleum Company, Ltd. (Anglo-Iranian) which owns a license on the southern portion of Andros Island as well as areas of water off the south and west coast, has been doing some gravity meter and reflection seismograph work in addition to the magnetometer, and was expected to make a location shortly after receipt of the full report on the latter.

Standard Oil Company (Bahamas) has done some gravity meter work on the shallow water areas covered by its exploration license, using a diving chamber with radar used to plot positions.

Bahamas Oil Company, Ltd., a subsidiary of Superior Oil Company of California, drilled a deep test on the northern part of Andros Island, abandoning it after running into mechanical troubles at a depth of 14,587 feet. No showings had been reported in its drilling, but it had reached the Lower Cretaceous formations at this extreme depth, finding the stratigraphy quite similar to that of southern Florida in the United States. This information will be valuable in correlating subsequent wells on structures indicated by various means. The company has meanwhile moved the rig back to the United States where it is being used in the Gulf Coast of Texas pending evaluation of the magnetometer survey.

Exploration licenses in the Bahamas and adjacent waters total 47,626 square miles (30,480,640 acres).

UNION OIL COUNTRY *Wire Rope*

DRILLING LINES
BAILING LINES
SAND LINES
CASING LINES
INDUSTRIAL WIRE ROPE

union-formed *Wire Rope*

IS *PREFORMED* TO OUT-PERFORM

When you need Preformed wire rope, specify union-formed.

UNION WIRE ROPE CORPORATION
Kansas City 3, Mo.

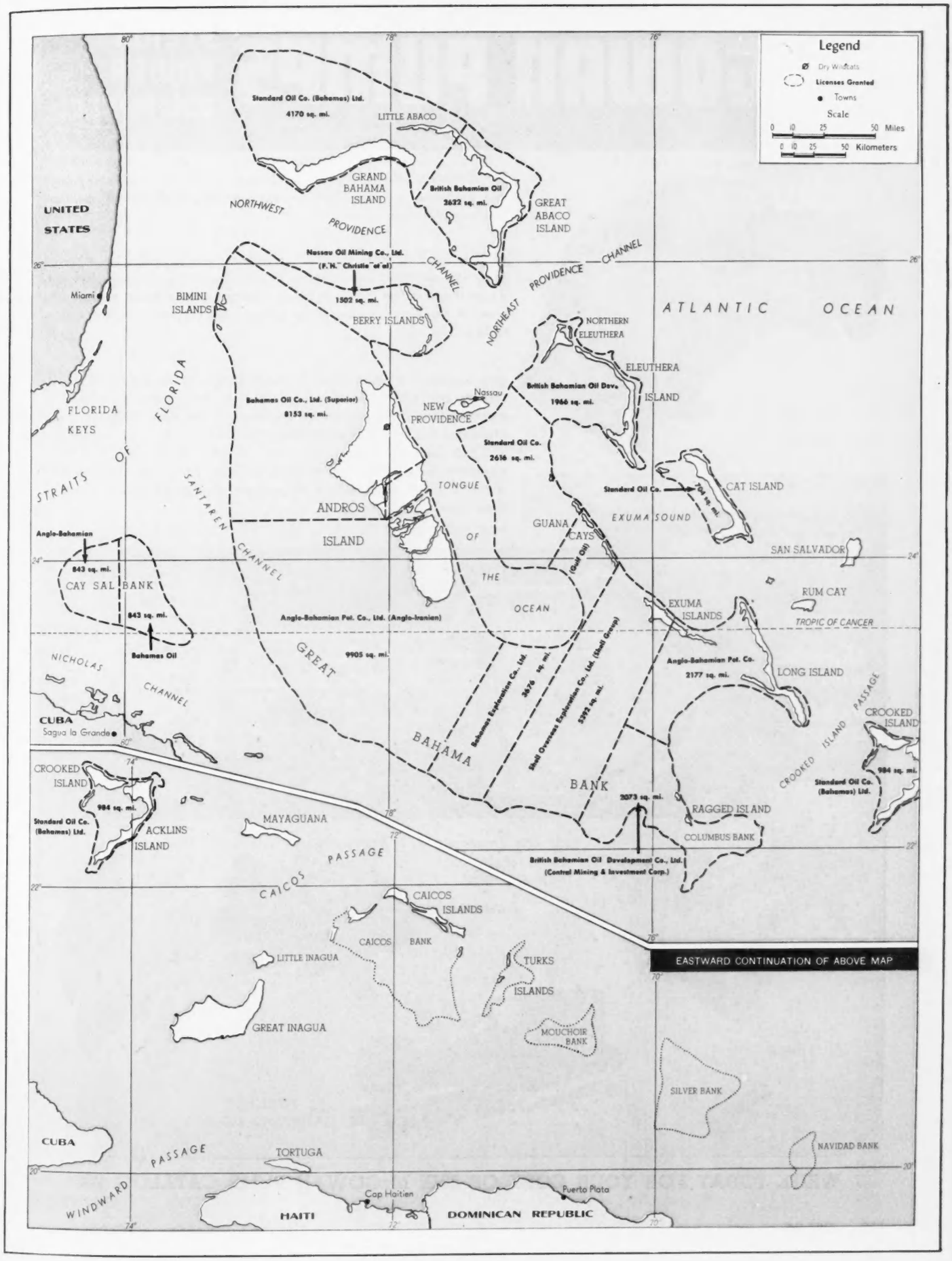
LUCEY

LUCEY EXPORT CORPORATION

233 BROADWAY . . . NEW YORK 7, N. Y.

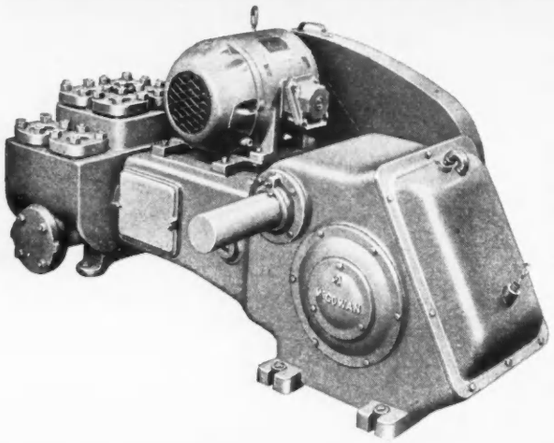
Broad Street House, London, E. C. 2, England ● 811 Sterling Building, Houston, Texas
San Fernando, Trinidad, B. W. I. ● Calle Defensa 320, Buenos Aires, Argentina
615 8th Avenue West, Calgary, Canada

WEST INDIES—Bahama Islands Concessions



McGOWAN PUMPS

STEAM POWER CENTRIFUGAL



McGOWAN CONSTRUCTION: McGowan pumps are constructed with two purposes in mind. First, for dependability and second, for economical operation.

As time goes on these construction features will probably be changed as newer materials and methods of construction are brought forward. So, in the next few years, as many changes will no doubt be made in order to serve our customers by giving them the best that any manufacturer can offer.

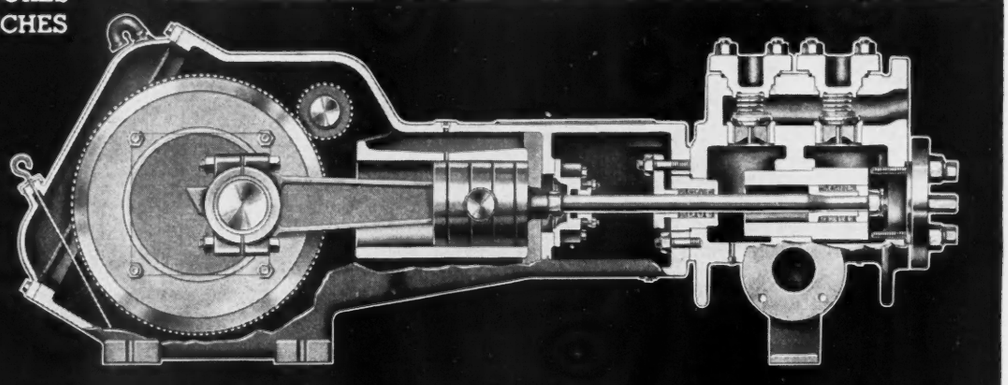
Our Engineering Department is not restricted in its choice of metallurgists and has an unlimited selection for foundries specializing in various casting methods in the alloys which we use. While we have attempted to design our equipment with the best features possible that will suit the large majority of users, we recognize the fact that some engineers lean toward other methods, and while our designs may differ in a few small details we will be glad to construct pumps to meet their specifications.

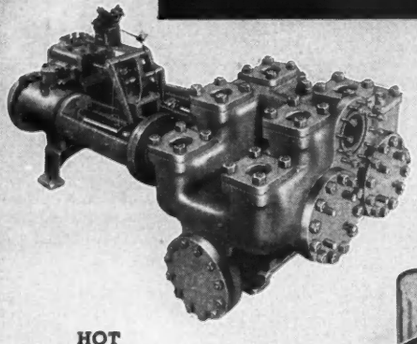
6, 10, 12, INCH STROKES
LINERS 2½ — 9 INCHES

PIPELINES

GATHERING LINES

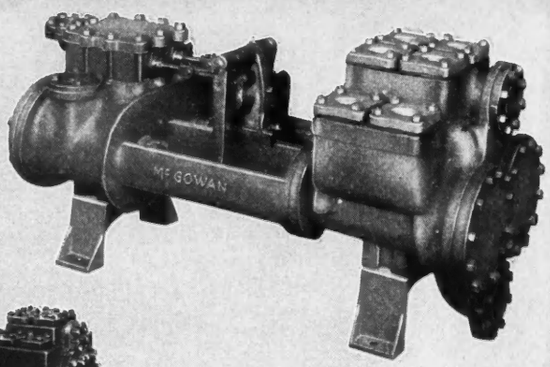
WATER SERVICE

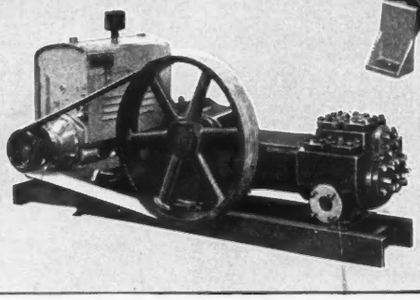




HOT OIL PUMPS

SIDE POT PUMPS
6, 10, 12, 18
INCH STROKES





PIPELINE GATHERING PUMPS

WRITE TODAY FOR YOUR COPY OF THE McGOWAN PUMP CATALOG 200

CUBA

CUBA'S exploration program met with little success during the past year, and hopes for increased production through exploitation of new reserves have not yet been fulfilled. The Jarahueca and Motembo fields are still the two sources of production, outside of the Bacuraneo field of Habana Province whose output has declined to approximately 900 barrels for the entire year. Total production for Cuba was 280,000 barrels, a 40 percent increase over 1946.

Continued drilling of Jarahueca has resulted in another increase in production to 220,000 barrels for the year, comparing with slightly less than 200,000 barrels in 1946, and 105,700 barrels in 1945. It is the youngest of the producing areas of Cuba, having been discovered in 1943, and wells are completed at depths ranging from 750 to 1500 feet. An average of 15 strings of cable tools were working in the field during most of 1947. The production is from serpentine, in igneous rock which is not a source bed, and is considered "seepage" production. Compañia Petrolera La Estrella de Cuba, one of the Shell Group subsidiaries, drilled a deep test on Cayo Coco, a key off the north coast and about 20 miles northeast of Jarahueca field from which it was hoped to gain some information on possible source beds, but no details have been reported on the results, although seismic exploration is being continued in the area and a 4277-foot core hole was drilled in addition to the 10,563-foot dry hole completed in August of 1947.

Motembo field, which has been producing since 1880, showed a slight decline from 1946, production being only 60,000 barrels for the year. In this field the pay is in the Upper Eocene, with the structure a monoclinal igneous barrier. With relatively small producting area, the field has been kept, through steady drilling, at a production of around 5500 barrels monthly for several years, but has declined now to 5,000 barrels. Oil from this field is almost pure natural gasoline produced at low gas-oil ratios. Gravity averages 58 to 61 degrees.

In Bacuraneo field in Habana province, 68 wells have been drilled to depths ranging from 400 to 1200 feet. It has produced a total of 147,800 barrels since 1915.

Cuba's producing properties are operated by nationals, but major foreign operators have done considerable geological and geophysical work as well as wildcat drilling. Included among foreign operators are Standard Oil Company of Cuba, Shell Group, and The Atlantic Refining Company.

The Standard Company drilled two wildcat dry holes during 1947, one of which, Baños 2, was in the Province of Pinar del Rio where three dry holes had been drilled previously, and the other in the Serpentine area near Maximo Gomez in Matanzas Province where a dry hole had been drilled in 1946. The company has now discontinued Cuban exploratory work and has disposed of its concession holdings.

Wildcat Drilling in Cuba in 1947

Province	Company, Well, Location	Date Completed	Total Depth (Feet)	Results
Camaguey	Cía. Petrolera La Estrella de Cuba Cayo Coco No. 2, 25 mile north of town of Morón	8/28/47	10,563	Abandoned, Dry hole.
Matanzas	Standard Oil Co. of Cuba's "T" 1 1¼ miles northwest of Maximo Gomez.	2/9 /47	1,389	Abandoned, Dry hole.
Piñar del Rio	Standard Oil Co. of Cuba's Baños 2.	1/30/47	4,080	Abandoned, Dry hole.

Refineries of Cuba

COMPANY	Location of Plant	Crude Charging Capacity (Barrels Daily)	Cracking Capacity (Barrels Daily)	Type of Refinery	Operating Status
Standard Oil Company of Cuba	Belot	4200	2100	S-C-I-A	Operating
Cía. Cubana de Petroleo, S.A.	Havana	500	None	Skimming	Operating
Petrolera Jarahueca	Jarahueca Field	200	None	Skimming	Operating
Total	3 Plants	4900	2100	.....	.....

DOMINICAN REPUBLIC

DOMINICAN Seaboard Oil Company, for the past several years the only operator in the Dominican Republic, gave up its eight-year search for commercial oil on Hispanola Island at the close of 1947. Late in June the company's Maleno 7 was abandoned after finding salt water and hydrogen sulphide at 5682 feet, and all of the firm's concession rights were surrendered in December.

The earliest test for oil of which record is available was drilled in 1904 by Lancaster and Krieder on the Higuerito structure near the south coast of the island, finding gas at 935 feet in sufficient quantities to cause a blowout and producing some oil before being abandoned. This company, followed by the Interocean Company and later by The Texas Company, drilled nine wells up to 1933 without finding production. In 1939 the first Dominican Seaboard well, Maleno 1, found oil at 1197 feet, producing 12,966 barrels of heavy, 19.9-gravity oil before it was exhausted. The second well, drilled to 3033 feet, also produced some oil, but recovery amounted to only 4553 barrels. Since then 13 additional wells have been drilled by the company, all dry holes. The deepest test was its Mella 1, southwest of the Maleno and Higuerito structures, taken to 8769 feet in 1946. The company's search, concentrated largely in the southeastern part of the Republic, led to drilling a total of 50,000 feet of hole on seven different prospects.

HAITI

THE Atlantic Refining Company, active in Haiti for the past three years, has completed its exploratory effort in that area after drilling two dry holes during 1947. The company's Cul de Sac 1, located five miles east of Port au Prince, spudded in July of 1946, and was carried to a total depth of 8064 feet before being abandoned as dry in April of 1947. A final test was drilled by the company in the summer of 1947 near St. Marc, being abandoned in September at 4099 feet. No showings had been reported. In 1944 the company started wildcatting, drilling first in the Jurinet area about 47 miles northeast of Port au Prince, the initial test going to 7005 feet and later deepening to 8000 feet without result. Later in 1944 the company drilled its Maissade 1 in the same general area to 9010 feet, the deepest well yet drilled on the island of Hispanola upon which Haiti and the Dominican Republic are located. Following failure of St. Marc 1 Atlantic halted operations and all of its concession in Haiti were surrendered to the government in December.

THROUGHOUT THE *Oil world*

GARDNER-DENVER OIL FIELD EQUIPMENT

Superior engineering—superior advantages—and long-lasting reliability—have won for Gardner-Denver's oil field equipment a firm place on the oil maps of the world.

Gardner-Denver slush pumps, oil line pumps and drilling engines are designed for round-the-clock schedules. They are built with the strength and ruggedness which oil field service demands—embodying latest engineering advances and refinements.

For complete information about Gardner-Denver oil field equipment, write Gardner-Denver Company.

GARDNER-DENVER

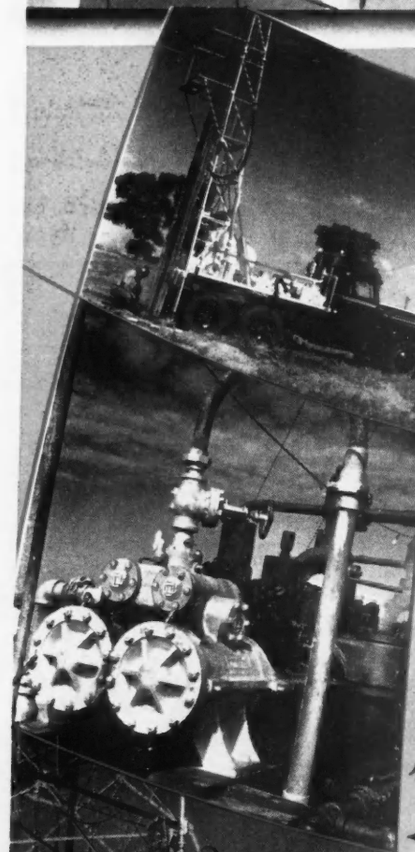
SINCE 1859

Export Division: 233 Broadway, New York 7, New York, U.S.A.

Gardner-Denver Company, Quincy, Ill., U.S.A. Dallas, Houston, Tulsa, St. Louis, Los Angeles, San Francisco, New York, Chicago, Pittsburgh, Denver

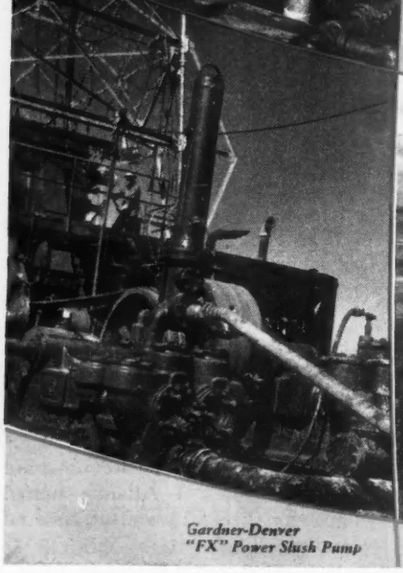
Continental Supply Co., Continental Bldg., Dallas, Texas

Republic Supply Company (of California) 2122 E. 7th Street, Los Angeles, Calif.

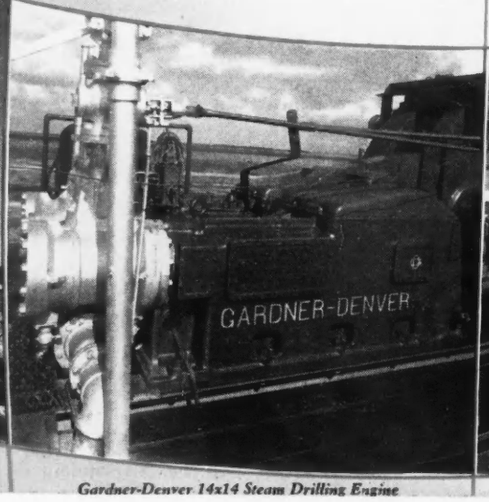


FXG Duplex Power Pump for geophysical and seismograph work

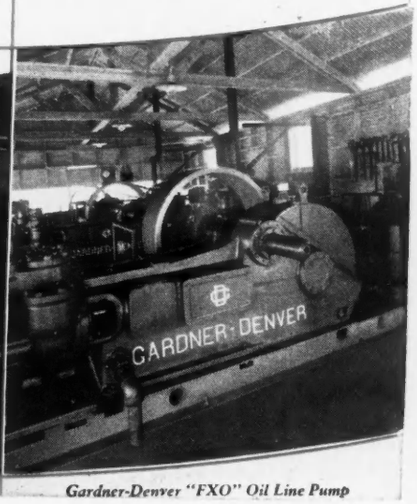
Gardner-Denver 18x8x20 Steam Slush Pump



Gardner-Denver "FX" Power Slush Pump

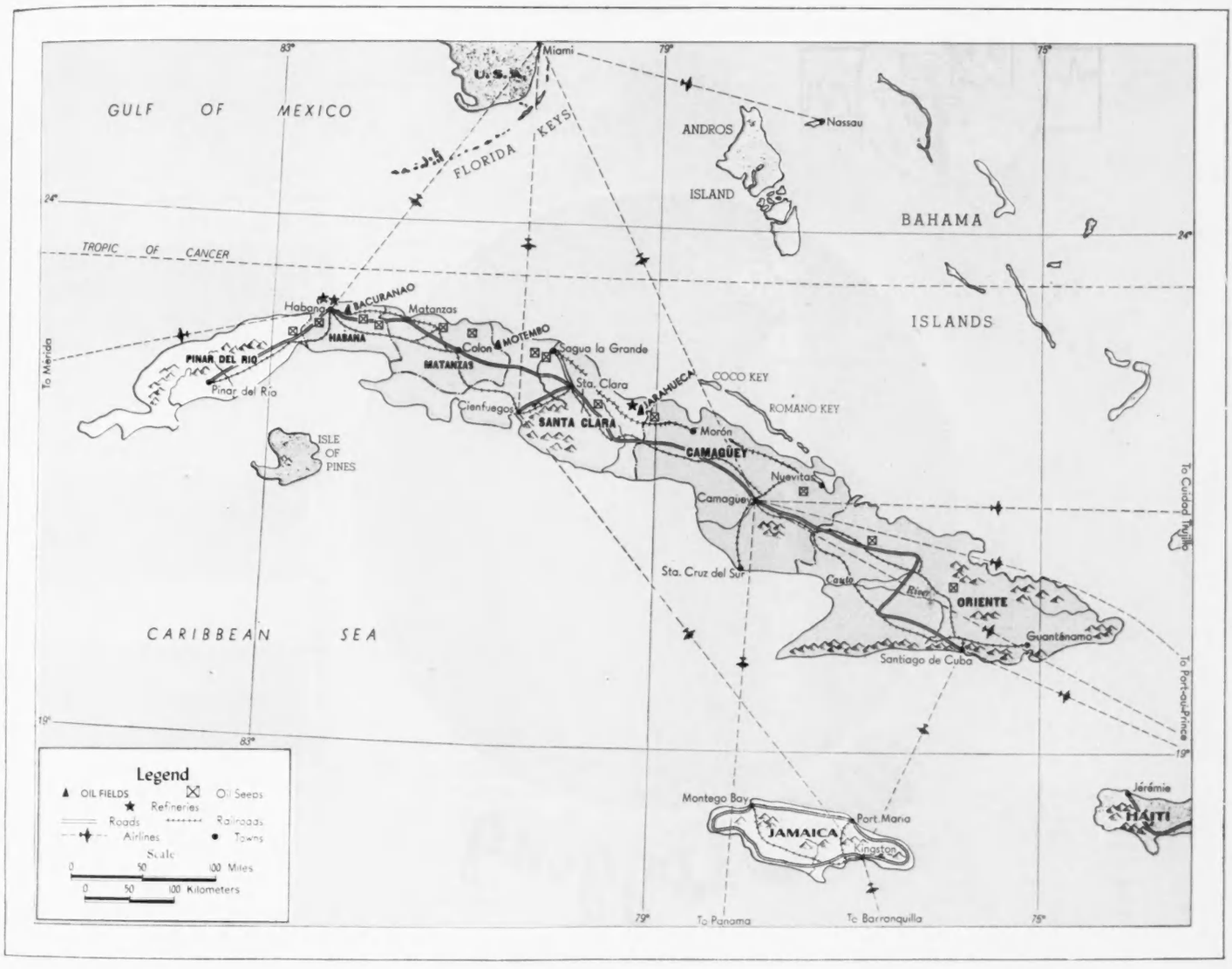


Gardner-Denver 14x14 Steam Drilling Engine

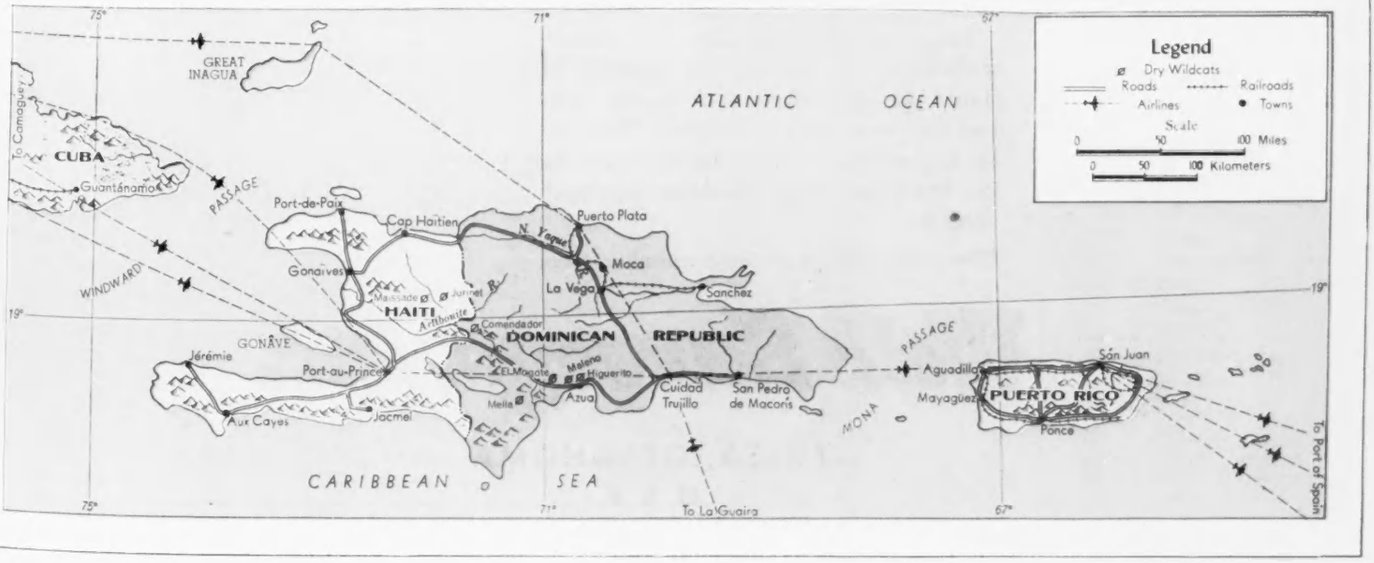


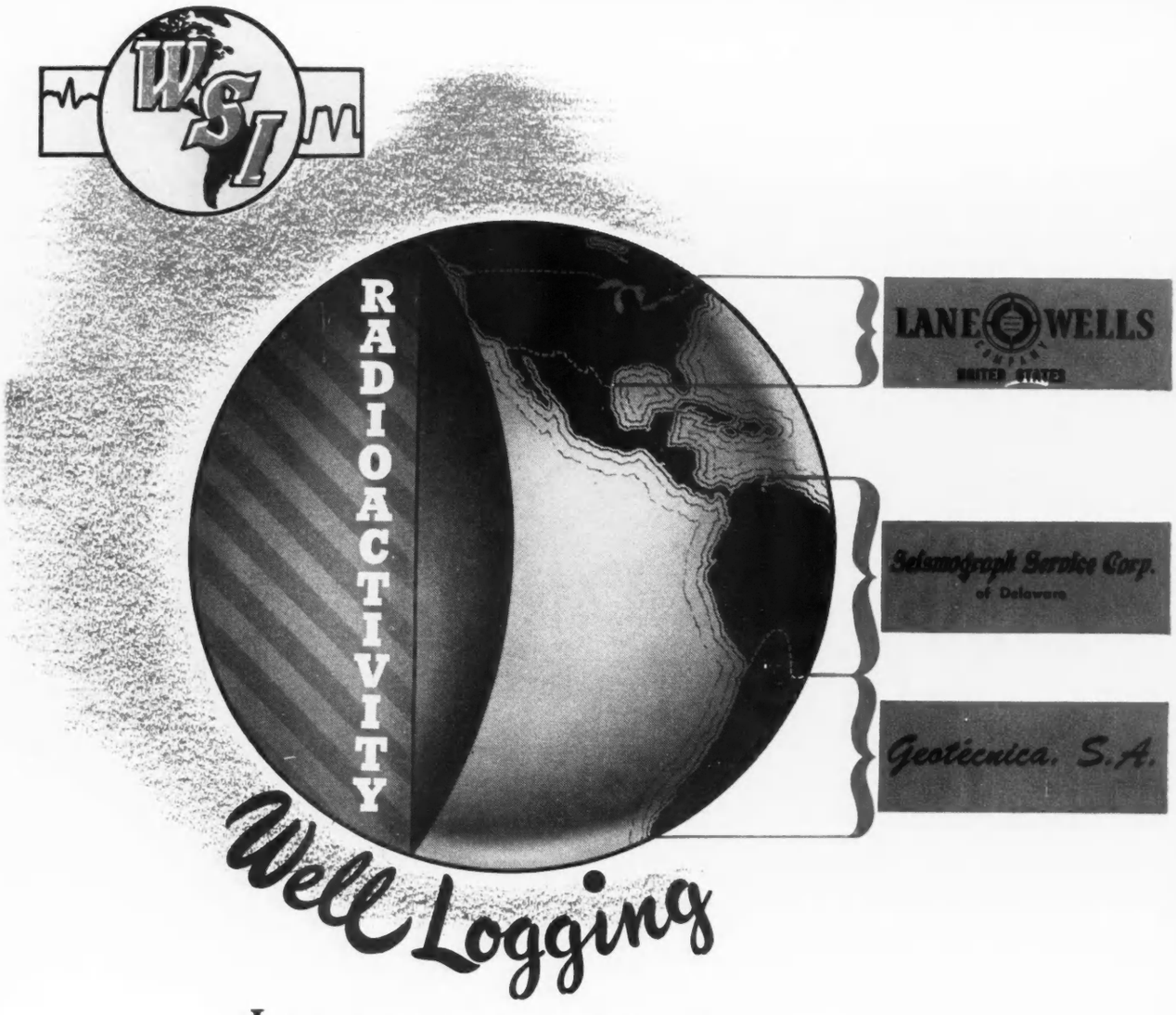
Gardner-Denver "FXO" Oil Line Pump

CUBA



DOMINICAN REPUBLIC and HAITI





IN *new* or *old* wells the W.S.I. method of Well Logging provides basic information necessary for the efficient completion, production and maintenance of the well.

The complete records provided by the Gamma Ray Curve, Neutron Curve, and Collar Log can be obtained through several casing strings.

Locations, differentiation and characteristics of formations; the location of fluid, porosity, location of casing seats and liner overlaps are disclosed. The Collar Log recorded simultaneously with the Gamma Ray Curve provides extreme depth accuracy.

Offered only through the above named licensees.

Well Surveys, Inc.

TULSA, OKLAHOMA
U.S.A.

TRINIDAD

FOLLOWING a temporary cutback in production during 1946 and early 1947, instituted as a relief from abnormal withdrawals of several years, Trinidad's output showed a gradual upswing near the end of 1947 as war-depleted reserves were being replaced by additional drilling and production of 20,520,554 barrels for the year represented an increase of 347,529 barrels over 1946. This upswing is expected to continue into 1948. Despite the age of the producing fields, semi-exploratory drilling around the edges continues to open new areas, such as a substantial extension to the Penal-Wilson fields which were joined by fill-in drilling and further extended to the southwest.

Trinidad Leaseholds, Ltd., is prospecting an interesting area north of Guayaguayare on the east coast where several shallow wells have shown promise of production in shallow sands on a broad, low-relief structure known as the Maloney prospect. During the year United British Oil Fields of Trinidad drilled the island's deepest well, a dry hole in the Cruse area which went to 11,042 feet.

With 23 rigs running most of the year, drilling is about 25 percent ahead of 1946 with 142 wells drilled, most of which were producers, and footage drilled was greater than at any time since before the war.

Total footage amounted to 281,228 feet, compared with 533,204 feet during 1946, and an increasing percentage of it was exploratory drilling. Toward the latter part of the year it was felt that field development schedules had been regained to the point where more equipment could be devoted to search for new oil. Significant of the emphasis on field work during the early part of the year was the fact that of 82 wells completed in the first seven months, only three were dry holes.

Recently it has become possible to start exploration in various sectors of the producing area to determine possibilities of production from the Cretaceous. Currently all of Trinidad's production is from Miocene formations and it is hoped that the Cretaceous may be found productive in some localities. Antilles Petroleum is now drilling a deep test in the Brighton area which has topped the Upper Cretaceous at 5555 feet and is still drilling, but no details are available on findings.

Geophysical work has been intensified in the central and southern part of the island, and interest is still keen in prospecting the submarine Gulf of Paria areas, but although tentative allocations have been made to several operating companies, none of the area has been formally granted by the Crown. Approval is being held up pending final agreement on terms.

An increase is noted in the volume of gas which is processed and returned to the reservoir for pressure maintenance. Gas now being handled in the principal fields amounts to three-quarters of a billion cubic feet monthly.

Refineries of Trinidad

Company	Location of Plant	Crude Charging Capacity (Bbls. daily)	Cracking Capacity (Bbls. daily)	Type of Refinery	Operating Status
General Asphalt Co.	La Brea	1,000	None	Asphalt	Operating part time.
Kern Trinidad Oilfields, Ltd.	Guapo field	1,000	None	Skimming	Operating part time.
Trinidad Leaseholds, Ltd.	Pointe-à-Pierre	50,000	20,500	Complete	Operating.
Trinidad Pet. Dev., Ltd.	Brighton	1,300	None	Skimming	Operating part time.
United British Oilfields of Trinidad, Ltd.	Point Fortin	40,000	None	Complete	Operating.
Totals		93,300	20,500		

Oil Production in Trinidad by Structures

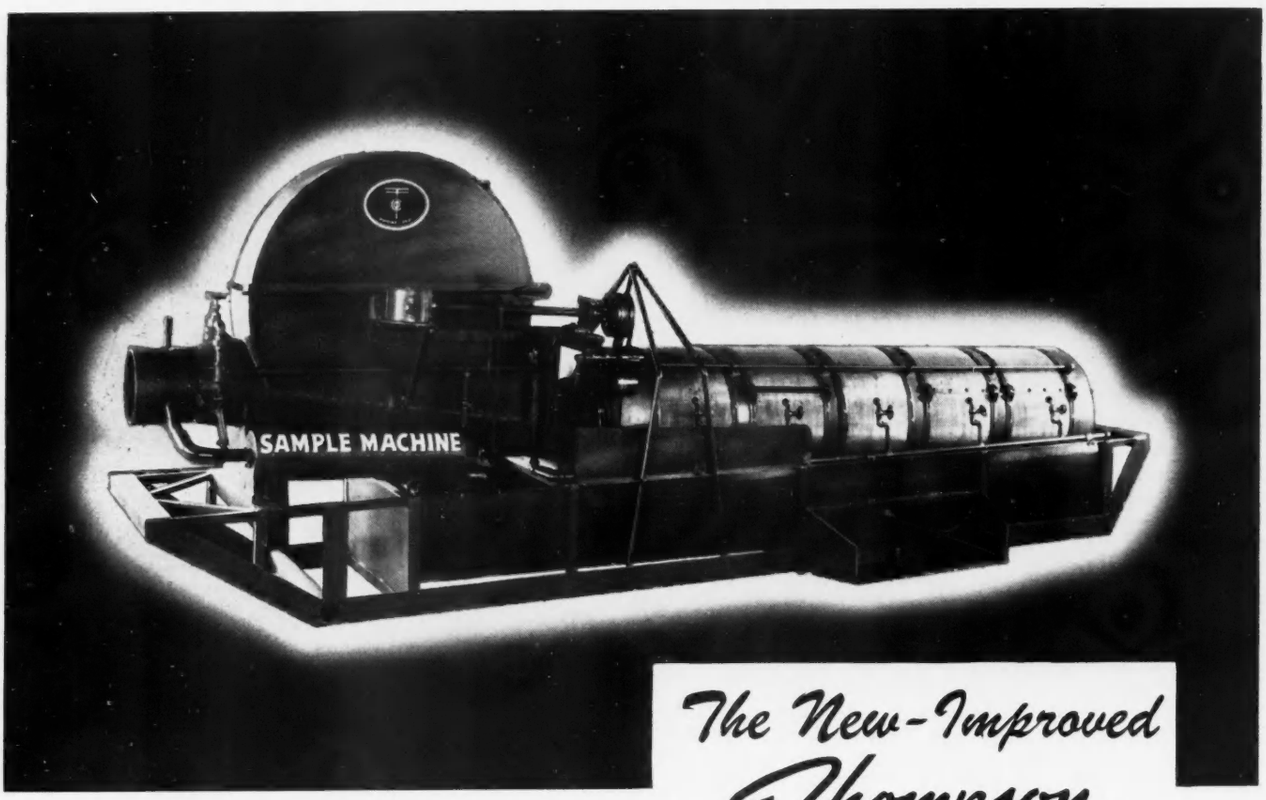
Structures	Producing Oil Wells End of 1947			CRUDE OIL PRODUCTION (Barrels)			
	Flowing	Art. Lift	Total Prod.	Daily at End of 1947	Year 1946	Year 1947	Cumulative Through 1947
Barrackpore-Penal	53	86	139	9,403	2,781,071	2,862,731	20,408,463
Coora-Quarry	101	157	258	8,495	2,763,685	3,071,270	29,294,555
Fyzabad	204	549	753	23,583	8,107,300	8,840,972	179,521,758
Guapo	163	190	353	9,317	4,110,950	3,430,637	66,072,085
Los Bajos	4	25	29	392	195,545	149,890	3,360,812
Palo Seco	31	155	186	1,455	547,500	559,027	23,696,100
Point Fortin	27	51	78	1,827	615,390	563,345	16,517,844
Brighton	23	45	68	1,384	448,950	602,033	6,266,134
Other Fields	20	50	70	1,075	602,630	440,649	8,236,920
Abandoned Fields	....	....	....	.....	.....	.....	4,853,537
Totals	626	1,308	1,934	56,931	20,173,021	20,520,554	352,228,208

Pipe Lines of Trinidad

Company	Origin	Terminus	Length (Mi.)	Diameter (Ins.)	Capacity (Barrels Daily)	Year Completed
Crude Oil Lines:						
Trinidad Leaseholds, Ltd.	Barrackpore	Phillipine	5.6	6	9,000	1921
	Forest Reserve	Pointe-à-Pierre	16.4	12	43,600	1940
	Forest Reserve	Pointe-à-Pierre	16.2	10	21,600	1928
	Guayaguayare	Barrackpore	21.8	6	8,600	1929
TLL-Siparia Trinidad Oilfields	Siparia	Forest Reserve	4.4	4	7,200	1931
	Cruse	Forest Reserve	4.2	6	7,200	1925
	Morne Diablo	San Francique	5.7	4	8,600	1939
United British Oilfields of Trinidad, Ltd.	Penal	Point Fortin	18	8		
	Quarry	Point Fortin	7.5	6		
	Los Bajos	Point Fortin	8	6		
	Los Bajos	Point Fortin	8	4		
	Morne Diablo and Coora	Los Bajos	5	(2)4		
	Brighton and Guapo	Quarry	23	6		
Totals			124.8		105,800	
Natural Gas Lines:						
Trinidad Leaseholds, Ltd.	Forest Reserve	Pointe-à-Pierre	16.2	8	10 mln.	1937

Engineering and Geological Data on Trinidad Fields

FIELD	Proved Area (Acres)	Probable Ultimate Proved Area	Range of Gravity Oil (API)	PRODUCING FORMATION			Depth of Wells (Ft.)		Type Structure
				Name	Kind	Age	Minimum Top Pay	Maximum Total Depth	
Forest Reserve	1200 1500	....	14.8-33.2	Forest Cruse	Sand	Miocene	0 1500	3500 8000	Anticline
Barrackpore	120	1500	17.3-30.6	Wilson	Sand	Miocene	500	3500	Faulted Anticline
Guayaguayare	110	....	15.3-49.9	Forest & Cruse	Sand	Miocene	0	5000	Fault trap.
Wilson-Penal	280	....	12.2-25.7	Wilson	Sand	Miocene	1600	2500	Faulted Anticline
Cruse	250	....	13.2-30.5	Cruse	Sand	Miocene	1800	4000	Strat trap.
Palo Seco	100	2000	17.8-33.4	Forest & Cruse	Sand	Miocene	1500	5500	Strat. trap.
Morne Diablo	50	....	20-33.2	Cruse	Sand	Miocene	1000	4700	Fault trap.
Quinan	40	....	25.9-34.1	Cruse	Sand	Miocene	1000	4300	Fault trap.
Fyzabad	5100	6000	19-30	Forest & Cruse	Sand	Miocene	1500	6500	Anticline
Brighton	500	800	18	Forest	Sand	Miocene	700	3000	Anticline
Coora-Quarry	900	1400	25.9	Forest & Cruse	Sand	Miocene	1200	6500	Syncline
Guapo	3050	3400	16.8-24	Forest & Cruse	Sand	Miocene	1500	5700	Plunging nose
Los Bajos	400	500	27.5	Forest & Cruse	Sand	Miocene	1000	6000	Fold-Fault
Parrylands	3000	....	....		Sand	Miocene	100	1200	Anticline
Point Fortin	1300	1300	19.5	Forest & Cruse	Sand	Miocene	1500	7500	Overthrust on fault
Tabaquite (abnd.)	....	....	42	Tabaquite		Eocene	300	500	Thrust fault



The New-Improved Thompson SHALE SEPARATOR AND SAMPLE MACHINE

SELF-MOTIVATED – SIMPLE – STURDY

The flow of mud into the THOMPSON SHALE SEPARATOR keeps it in motion, transmitting power to the rotary screen drum – no motors to maintain, repair or replace. The THOMPSON system of reconditioning your mud will save many times the cost of the machine – clean mud means greater drilling efficiency. All moving parts are easily reached, sturdily constructed.

The THOMPSON SAMPLE MACHINE, attached to the Separator unless specified, gives a highly accurate picture of strata cuttings. For economy, accuracy and dependability, call for THOMPSON field-tested Shale Separators and Sample Machines.

THREE *Thompson* MODELS

MODEL "DW"
FOR DEEP WELLS
OVERALL WEIGHT . . .
2,550 POUNDS

MODEL "LR"
FOR MEDIUM WELLS
OVERALL WEIGHT . . .
1,550 POUNDS

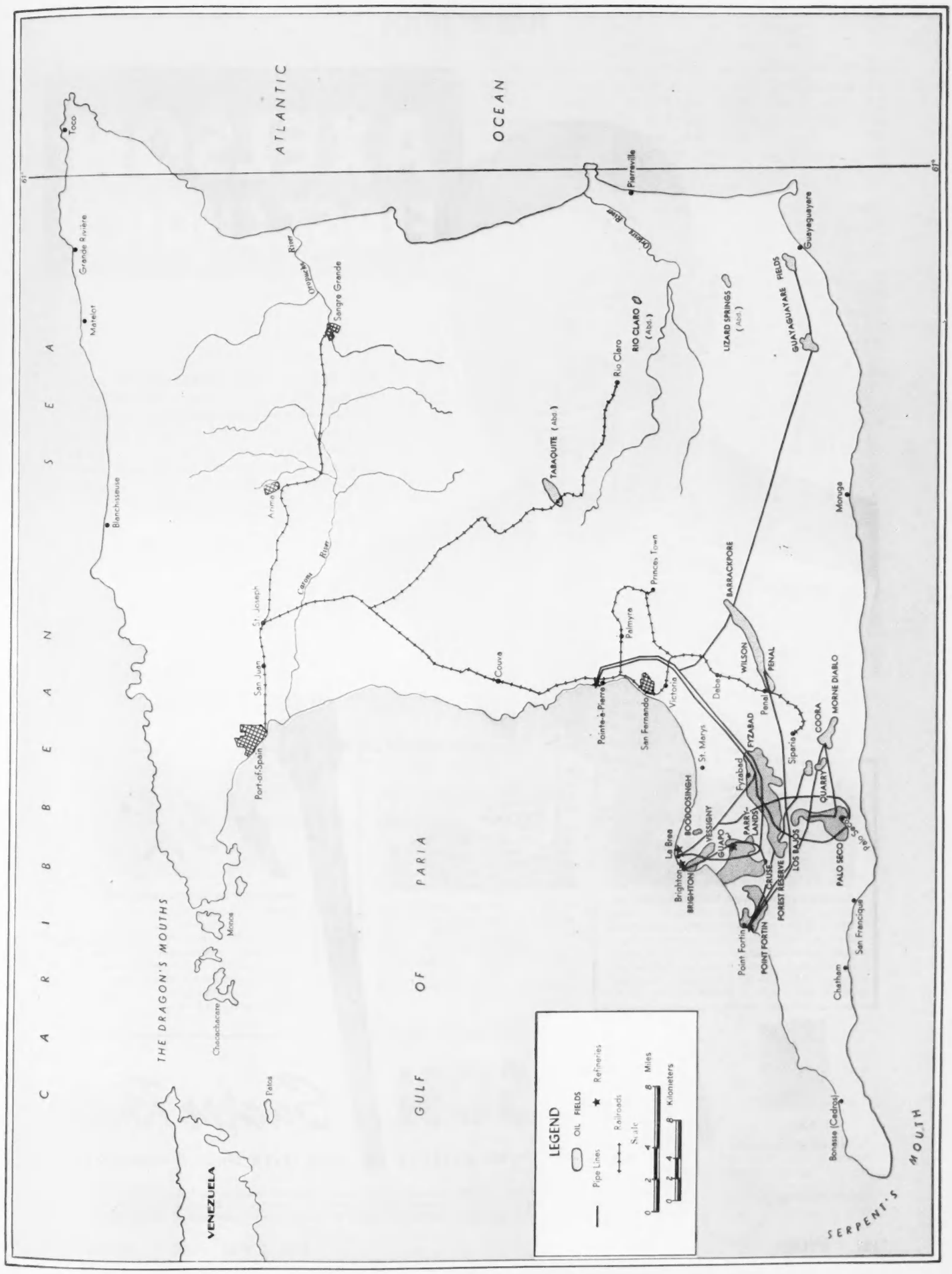
MODEL "SR"
FOR SHALLOW WELLS
OVERALL WEIGHT . . .
1,400 POUNDS

THOMPSON TOOL CO.

IOWA PARK, TEXAS

KEEPS DRILLING MUD *CLEAN* — PROVIDES *TRUE SAMPLES* OF CUTTINGS

TRINIDAD

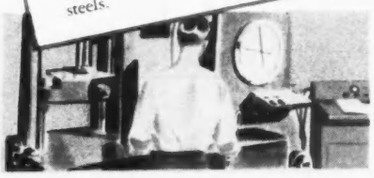

ATLANTIC OCEAN
CARIBBEAN SEA
GULF OF PARIA
THE DRAGON'S MOUTHS
SERPENT'S MOUTH
VENEZUELA
Toco
Grande Rivière
Matelot
Blanchisseuse
Arima
Sangre Grande
Oropuche River
Ortoire River
Pierreville
Guayaguayare
GUAYAGUAYARE FIELDS
LIZARD SPRINGS (Abd.)
RIO CLARO (Abd.)
Rio Claro
TABAQUITE (Abd.)
Mayaro
Monge
St. Joseph
Caroni River
San Juan
Port-of-Spain
Couva
Princes Town
Palmyra
Pointe-à-Pierre
San Fernando
Victoria
BARRACKPORE
Debe
WILSON
PENAL
Penal
Siparia
CORA
MORNE DIABLO
St. Mary's
Fyzabad
PYZABAD
QUARRY
BOODOOSINGH
VESSIGNY
GUAPO
PARRY-LANDS
La Brea
Brighton
BRIGHTON
CRUSE
LOS BAJOS
FOREST RESERVE
PALO SECO
Point Fortin
POINT FORTIN
San Francique
Chatham
Bonasse (Cadrop)
Mucurapo
Chaguaramas
Carenage
Maraval
Diego Martin
Petit Valley
Santa Cruz
Arima
Manzanilla
Mayaro
Icacos
Point Galeta
Toco
Matelot
Blanchisseuse
Arima
Sangre Grande
Princes Town
Palmyra
Couva
Pointe-à-Pierre
San Fernando
Victoria
Debe
Penal
Siparia
Fyzabad
St. Mary's
La Brea
Point Fortin
San Francique
Chatham
Bonasse (Cadrop)
Monge
Guayaguayare
Pierreville
Rio Claro
Port-of-Spain
San Juan
St. Joseph
Chacachacare
Monos
Petca
LEGEND
OIL FIELDS
Pipe Lines
Refineries
Railroads
Scale
Miles
Kilometers

AXELSON FIRST CHOICE

PURCHASING AGENTS AGREE, when they place the name "AXELSON" on a sucker rod purchase order, they have specified unquestioned reliability and assured performance. PA's know there is no better sucker rod than an Axelson, because they are manufactured by the company who pioneered every major improvement in the field of sucker rod design and they don't cost a penny more "spec-for-spec."

HALF-A-CENTURY OF CONFIDENCE is behind the name AXELSON . . . Manufactured in a factory devoted *exclusively* to production of sucker rods . . . under rigid laboratory control . . . by an organization noted for their ability to obtain the highest physical properties from the best sucker rod steels.

THERE IS NO ECONOMICAL SUBSTITUTE FOR QUALITY



GUARANTEED MINIMUM SPECIFICATIONS, not average "specs," are quoted in all cases . . . selection of desired rod type simplified . . . allowance for "low limits" unnecessary . . . end-to-end normalizing and tempering assures absence of localized stresses . . . complete descaling followed by rigid inspection guarantees freedom from surface defects which would accelerate corrosion attack.

QUICK DELIVERY AND ENGINEERING SERVICE go along with the purchase order that specifies "AXELSON" . . . Stocks at the "well-side" in most fields . . . Axelson Field Engineers on constant call in all producing areas . . . Prompt, personal attention by qualified specialists on all production problems.

APPROVED BY MANAGEMENT AND CREW . . . The men who maintain production know Axelson rods are "okay" . . . costly, labor-consuming shut-downs minimized . . . precision-machined shoulders, faces, and threads assure quick, easy preloading and a positive joint . . . strings can be made-up and run-in faster . . . keep pumping longer.

FREE

To Petroleum Production Men *"Not How Much . . . But How Well!" a 56-page book tells you the story of AXELSON'S sucker rods and couplings. Write today for your copy.*

AXELSON *Sucker Rods*

PROVED DEPENDABILITY FOR OVER HALF A CENTURY

AXELSON MANUFACTURING CO. • **PLANTS**—Los Angeles 11; St. Louis 16 • **OFFICES**—New York City 7; Tulsa 1; Buenos Aires, Argentina; Caracas, Venezuela • **DISTRIBUTORS**—Jones & Laughlin Supply Co.; Great Northern Tool & Supply Co.; C. C. McDermond, Maracaibo, Venezuela; Industrial Agencies, Ltd., San Fernando, Trinidad, B.W.I.; Industrias Waldrip & Campbell, Caracas, Venezuela.

ARGENTINA

ARGENTINA, through the receipt of some new drilling and other oil field equipment in late 1946 and 1947, was enabled to show results in the form of increased production. Total output of 21,845,600 barrels was more than a million barrels greater than 1946, although still far short of rates which must be attained if requirements of the Five-Year Plan are to be met. The greater part of the increase was made possible by output from the Caleta Olivia district where much of Argentina's exploratory footage was drilled in a program of defining and evaluating the Cañodon Seco field, with encouraging results. It is even thought possible that the area may connect with Comodoro Rivadavia. According to Yacimientos Petroliferos Fiscales (Government Oil Company) reports, deepening of old wells in the Comodoro Rivadavia area has led to opening of new producing section. However, it is apparent that more new reserves must be found if production is to be maintained.

Argentina's policy of retaining national reserves for operation by the government agency has not been altered to allow private companies to expand, but of importance during the year was the decision of the government to employ outside aid for exploration and development, exemplified by the contract with Drilling and Exploration Company for a series of 40 wildcat wells. The wells are to be drilled in locations selected by YPF, with Drilesco furnishing the rigs and crews. Plans are now under way for inviting such contracts for development wells.

YPF has been granted a credit of $100 million to finance its part of the Five-Year Plan, in addition to $67 million in the 1948 budget for drilling, transport, refining and marketing equipment, but purchases are still being held in suspension because of dollar exchange difficulties.

Producing Wells and Drilling Activity in Argentina by YPF and Private Companies

YEAR	PRIVATE COMPANIES			GOVERNMENT (YPF)			TOTAL (Private and Government)		
	Wells Completed in Year	Feet Drilled During Year	Wells Producing End of Year	Wells Completed in Year	Feet Drilled During Year	Wells Producing During Year	Wells Completed in Year	Feet Drilled During Year	Wells Producing End of Year
1939	153	414,625	1278	164	652,533	1854	317	1,067,158	3132
1940	120	347,680	1274	187	721,226	1950	307	1,068,906	3224
1941	149	406,858	1356	226	878,568	2150	375	1,285,426	3506
1942	162	460,568	1448	203	885,528	2355	365	1,346,096	3803
1943	119	436,850	1426	144	656,528	2465	263	1,093,378	3891
1944	122	369,109	1463	103	483,906	2490	225	846,315	3953
1945	98	305,472	1365	126	403,501	2557	224	708,973	3922
1946	100	273,630	1384	95	346,714	2607	195	620,344	4391*
1947	88	296,305	1376	120	478,091	2695	208	774,396	4346†

* Includes 1290 shut-in producers. † Includes 1300 shut-in producers.

Argentina Crude Oil Production by Regions, YPF and Private Companies for Recent Years

YEAR	CHUBUT*		NEUQUEN		SALTA		MENDOZA		TOTAL		GRAND TOTAL
	YPF	Private[1]	YPF	Private[2]	YPF	Private[2]	YPF	Private[3]	YPF	Private	
Prior to 1944	137,499,011	100,289,709	10,724,155	10,975,559	6,514,912	16,636,947	12,604,982	319,236	167,343,060	128,221,451	295,564,541
1944	10,226,615	6,875,895	1,923,249	445,005	961,366	682,081	3,034,396	21,292	16,205,626	8,024,273	24,229,899
1945	9,722,422	6,411,096	1,964,141	382,061	665,281	618,949	3,102,020	14,999	15,453,864	7,427,105	22,880,969
1946	8,746,765	5,680,585	1,936,536	343,963	466,465	556,064	3,059,970	9,001	14,209,736	6,589,613	20,799,349
1947	9,913,417	5,789,590	2,024,800	296,048	471,414	494,382	2,847,133	8,816	15,256,764	6,588,836	21,845,600
Cumulative to 12-31-47	176,108,260	125,046,875	18,572,881	12,442,636	9,079,438	18,988,423	24,708,501	373,344	228,469,080	156,851,278	385,320,358
Daily Average Prod. End of 1947	27,153	15,783	5,924	858	1,331	1,246	8,201	27	42,609	17,914	60,523

* Includes Caleta Olivia. [1] Includes Diadema, Ferrocarrilera, and Astra. [2] Standard Oil. [3] El Sosneado.

Oil Production and Producing Wells in Argentina

Province and Field	Operating Company	Year of Discovery	PRODUCING OIL WELLS END OF 1947			CRUDE OIL PRODUCTION (Barrels)			
			Flowing	Art. Lift	Total Producing	Daily at End of 1947	Year 1946	Year 1947	Cumulative Through 1947
CHUBUT: (Comodoro Rivadavia District):									
Astra	Cía. Astra de Petroleo	1914	....	270	270	2 640	850 821	860.286	27,838,636
Kilometro 8	Cía. Ferrocarrilera Pet.	1915	....	270	270	1,103	435,614	413,956	25,297,852
M. Rosales		1922	....	112	112	699	212,753	244,153	7,533,073
Solano		1924	....	103	103	511	216,068	210,359	2,948,403
J. Segundo		1922	....	18	18	67	43,307	38,159	639,498
Reserva		1922	....	2	2	16	1,679	4,937	132,033
Sindicato		1928	....	47	47	256	79,499	91,502	1,021,246
Kilometro 27	Cía. Diadema de Petroleo	1924	....	380	380	10,491	3,840,844	3,926,238	63,636,134
Comodoro Rivadavia	Yacimientos Petroliferos Fiscales (Y.P.F.)	1904	7	1,373	1,380	25,077	8,612,977	9,154,407	175,215,462
MENDOZA:									
Barrancas	Y. P. F.	1938	23	....	23	3,849	1,306,867	1,273,928	5,658,661
Lunlunta		1938	2	9	11	937	278,929	348.783	1,882,922
Tupungata		1933	5	21	26	3,415	1,474,174	1,224,422	17,166,918
El Sosneado	Cía. "El Sosneado"	1926	....	19	19	27	9,001	8.816	373,344
NEUQUEN: (Plaza Huincul District):									
Plaza Huincúl	Standard Oil Co. S.A. Argentina	1924	7	43	50	555	343,960	191,340	4,493,991
Plaza Huincúl	Y. P. F.	1924	4	55	59	654	280,640	269,187	10,301,686
Challacó		1940	5	62	67	5,270	1,655,896	1,755,613	8,271,195
Dadin	Standard Oil	1925	....	41	41	303	.....	104,708	7,948,645
SALTA:									
Agua Blanca	Standard Oil	1924	....	2	2	74	32,472	29,306	1,278,619
Lomitas		1927	....	31	31	222	85,592	81,320	3,355,264
Ramos		1937	....	2	2	21	8,251	7,349	64,567
Rio Pescado	Y. P. F.	1933	4	19	23	477	169,388	165,388	3,044,982
San Pedro	Standard Oil	1928	1	19	20	900	416,181	364,539	14,195,888
Tartagal		1927	....	3	3	29	13,567	11,868	94,085
Tranquitas	Y. P. F.	1928	2	69	71	838	291,616	299,717	5,429,722
Vespucio		1928	....	3	3	16	5,561	6,309	604,729
SANTA CRUZ:									
Cañodón Seco		1945	10	3	13	2,076	133.788	759,010	892,798
Total		....	70	2,976	3,046	60,523	20,799,445	21,845,600	385,320,353

TRETOLITE COMPANY

Manufacturing Chemists

ST. LOUIS • LOS ANGELES

The Tretolite Company specializes in chemical reagents developed especially to facilitate the production, shipping and manufacture of petroleum products. Listed below are the products and services offered, and the locations of Tretolite Company facilities and service engineers.

FOR PETROLEUM PRODUCERS	FOR PETROLEUM REFINERS
Demulsifiers: Water-in-Oil Emulsions	Desalting Chemicals and Processes
Desalting Reagents and Processes	Water Clarification Chemicals
Corrosion Preventive Compounds	Surface Tension Depressants and Inhibitors for use in Acid Treatments
Demulsifiers and Surface Tension Depressants for use in Acidizing of Formations	Demulsifiers for Petroleum and Waste Oil Emulsions
Demulsifiers: Oil-in-Water Emulsions	Demulsifiers and Foam Preventers for use in Doctor Treating and other Sweetening Solutions
Paraffin Solvents	Lubricating Oil Additives
Corrosion Inhibitors for Oil Wells	Corrosion Preventive Compounds
Cleaning Compounds	Cleaning Compounds

TRETOLITE REGIONAL HEADQUARTERS

TULSA, OKLAHOMA
P. O. Box 1318

DALLAS, TEXAS
2507 Mercantile Bank Bldg.

SAN ANTONIO, (5) TEXAS
706 Milam Bldg.

TRETOLITE OFFICES

Headquarters and Factory
St. Louis 19, Missouri

Pacific Coast Headquarters and Factory:
5515 Telegraph Road,
Los Angeles 22, California

TRETOLITE FIELD ENGINEERS

ARE LOCATED AS LISTED BELOW:

ARKANSAS
El Dorado, Phone 1447

CALIFORNIA
Los Angeles, Phone AN 7247
Bakersfield, Phone 7-7152
Phone 3-3459
Coalinga, Phone 350
Santa Maria, Phone 1427W
Taft, Phone 93
Ventura, Phone 5203

ILLINOIS
Carmi, Phone 516LX
Mt. Vernon, Phone 227
Olney, Phone 181

KANSAS
Eldorado, Phone 1600
Great Bend, Phone 183 or 869
Hays, Phone 217
McPherson, Phone 1775
Russell, Phone 824
Wichita, Phone 4-8314

KENTUCKY
Henderson, Phone 4354

LOUISIANA
Broussard, Phone 9504
Jena, Phone Goodpine 76
Lafayette, Phone 531
Lake Charles, Phone 4938
Ruston, Phone 532

MICHIGAN
Mt. Pleasant, Phone 31-141

MISSISSIPPI
Hattiesburg, Phone 376-W
Jackson, Phone 4-6337

NEW MEXICO
Hobbs, Phone 449 or 341-W

OHIO
Lakewood, Phone 2805

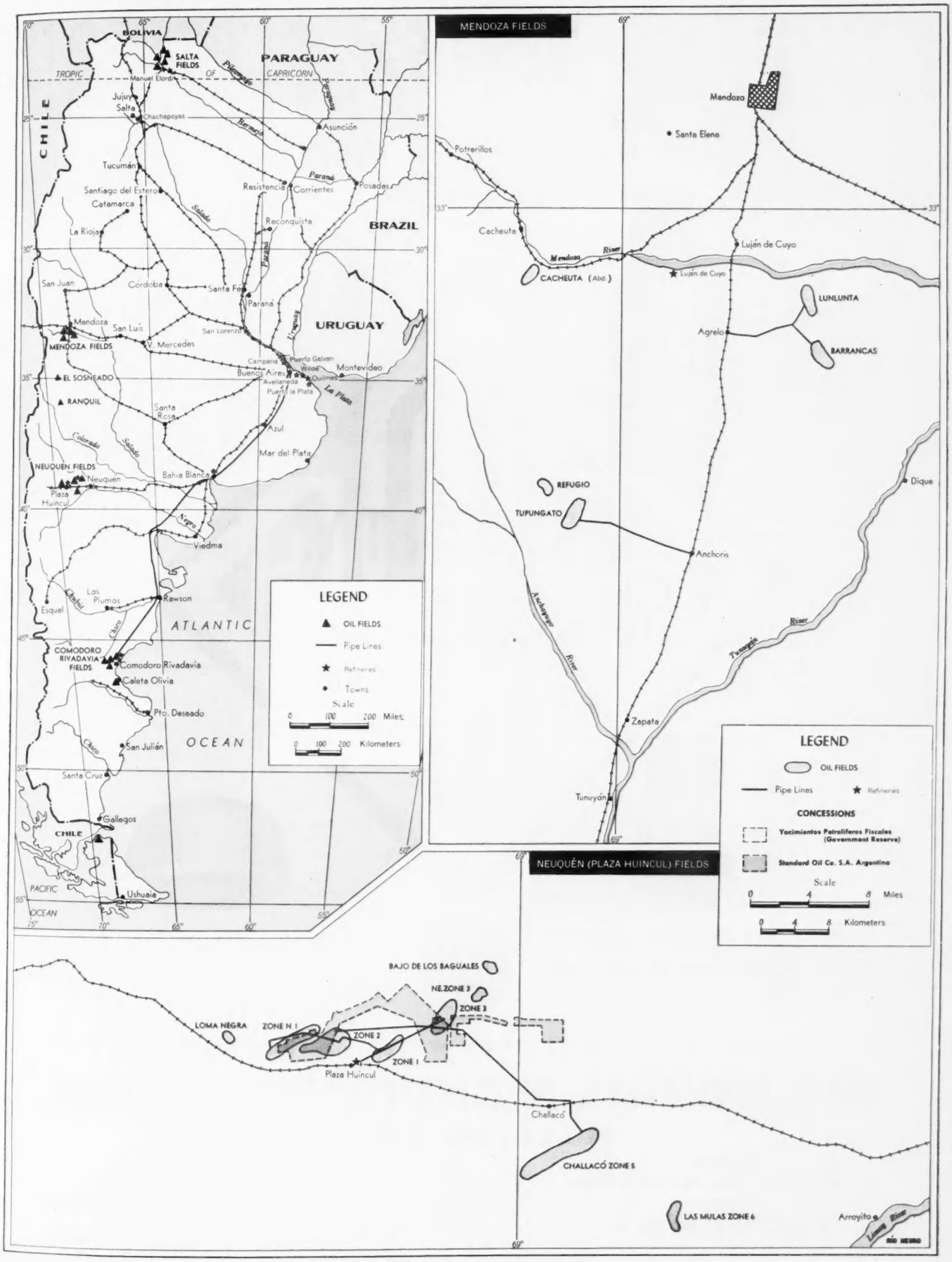
OKLAHOMA
Ada, Phone 1181-W
Duncan, Phone 487
Oklahoma City, Phone
5-1088 or 9-5424
Shawnee, Phone 3693
Wewoka, Phone 488
Wilson, Phone 63

TEXAS
Alice, Phone 503
Amarillo, Phone 8935
Beaumont, Phone 2-1522
Corpus Christi, Phone 6927
Dallas, Phone Riverside 4530
Edna, Phone 317
Houston, Phone Woodcrest
6-7457
Kingsville, Phone 1336
Levelland, Phone 115
Longview, Phone 803 or 1805
Midland, Phone 1446
Odessa, Phone 887
San Antonio, Phone
Cathedral 9871
Tyler, Phone 3160W or 4662
Victoria, Phone 2146
Wichita Falls, Phone 8242,
5701 or 2-1312

WYOMING
Casper, Phone 2825 or 2006

SOUTH AMERICA
Mont Land
El Pinar del Paraiso
Avenida A, Quinta Tejana
Caracas, Venezuela
Phone 24390

ARGENTINA—Mendoza and Neuquen (Plaza Huincul) Fields and Concessions



NORRIS *Quality* FITTINGS

NORRISIZED SWAGED NIPPLES

Forged from seamless steel tubing to rigid API specifications.

NORRISIZED BULL PLUGS

Triple-thick nose for strength where strength is needed.

QUALITY PRODUCTS

FORGED STEEL WELDING REDUCERS

Forged from finest quality, full weight seamless steel pipe.

SILVER 1923 IPE 1948 ANNIVERSARY

FORGED STEEL WELDING CAPS

Like all Norris products, made to highest standard of quality.

FOR COMPLETE SPECIFICATIONS WRITE FOR BULLETIN NO. 31-A

W.C. NORRIS, MANUFACTURER, INC.

TULSA, OKLAHOMA

BRANCHES:
HOUSTON, KILGORE, ODESSA, TEXAS; SALEM, ILLINOIS

EXPORT:
30 ROCKEFELLER PLAZA, NEW YORK CITY

Since QUALITY NORRIS PRODUCTS 1882

WEST COAST DISTRIBUTORS:
REPUBLIC SUPPLY COMPANY OF CALIFORNIA,
Los Angeles

ARGENTINA—Continued

Contracts have been awarded for construction of three new combination refinery units at La Plata, San Lorenzo and Lujan de Cuyo plants, at a cost of $30 million, and will replace the original proposal for a new 22,500-barrel plant at Buenos Aires. The three new units will have combined capacity of 33,000 barrels a day, with cracking.

With rising consumption and with many old fields in the stripper state, much emphasis is to be placed on exploration in Argentina. It has been necessary to materially reduce dollar exchange by purchase of crude and products from abroad, and during 1947 nearly 30 percent of total crude run to stills was of foreign origin. Consumption during the first nine months of the year was more than 17 million barrels higher than domestic production. Rationing of motor fuels has been instituted, with restrictions placed on taxicabs and trucks as well as private owners. Operators of private cars may purchase only 2.6 gallons of motor gasoline every other day.

The private companies, operating within the established boundaries of old concessions, have been remarkably successful in keeping their production decline to a minimum, but only at the expense of heavy drilling. During 1947 private companies produced only a few hundred barrels less than in 1946, but while daily average output of 17,914 barrels is only 29.6 percent of Argentina's total, the private operators drilled 42.3 percent of the total of 208 wells drilled during the year, and in 1946 the proportion was even greater, amounting actually to more than the YPF drilled.

Construction was started during the year on the 1100-mile gas pipe line from the Comodoro fields to Buenos Aires, having started first on the segment from Buenos Aires to Bahia Blanca. The line is designed to carry 35 million cubic feet of gas daily for industrial and domestic uses. Fields in the southeastern part of the Comodoro Rivadavia group are expected to supply the major portion of the gas.

Geological and geophysical work has been pushed during the year, with at least eight geophysical parties active during most of the year. Equipment in use includes three reflection seismographs, two refraction seismographs, three gravitymeters and one magnetometer. Geological work has been carried out in most of the states and more wildcats are scheduled in addition to those drilled during the year. One of the areas scheduled for early drilling is the region northeast of Chile's Cerro Manantiales field on the island of Tierra del Fuego which, along with the southern tip of Patagonia, is considered with favor by Argentine geologists.

Exploration drilling in the past few years has been largely localized around presently producing areas in an effort to

Refineries of Argentina

COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery	Operating Status
Cía. Nativa de Petroleos	Campana	16,000	8,000	Complete	Operating
	Puerto Galvan	3,000	1,850	Skim-Crk.	Operating
Diadema Argentina S.A. de Petroleo (B.P.M.-Shell)	Dock Sud-Avellaneda (Buenos Aires)	12,000	8,000	Skim-Crk.	Operating
Condor S. A. Petrol. Argentina	Avellaneda (Buenos Aires)	750	None	Skim-Lube	Operating
Lottero-Papini y Cía.	Avellaneda (Buenos Aires)	630	None	Skim-Lube	Operating
Cía. "La Isaura", S.A.	Bahia Blanca	2,200	None	Skim.	Shut Down
Standard Oil Co. S.A. Arg.	Manuel Elordi	1,000	None	Skim.	Operating
	Plaza Huincul	315	None	Skim.	Operating
Ultramar S.A. Petroleo Argentina	Avellaneda (Buenos Aires)	5,400	2,850	Complete	Operating
Cía. General Asfaltos	Wilde (Buenos Aires)	500	None	Skim-Lube	Operating
"Astra" Compañía de Petroleo, S.A.	Comodoro Rivadavia	2,500	None	Skim.	Shut Down
Compania Ferrocarrilera de Pet.	Comodoro Rivadavia	6,300	2,000	Skim-Crk.	Operating
Yacimientos Petroliferos Fiscales (YPF)	La Plata	41,000	24,200	Complete	Operating
	San Lorenzo	10,700	None	Comb. Unit	Operating
	Luján de Cuyo	3,465	1,000	Comb. Unit	Operating
	Chachapoyas	1,900	None	Comb. Unit	Operating
	Plaza Huincúl	1,260	504	Skim.-Crk.	Operating
S. A. Com. e'Indust. "Ragor"	Quilmes (Buenos Aires)	150	None	Skim.-Lube	Operating
Total	18 plants	100,745	46,700		

Drilling in Argentina

Province and Field	Operating Company	WELLS COMPLETED IN 1946					WELLS COMPLETED IN 1947					Field Wells Drlg & S.D. at End of 1947		
					Total					Total				
		Oil	Gas	Dry	Wells	Footage	Oil	Gas	Dry	Wells	Footage	Drlg.	S.D.	Total
CHUBUT: (Comodoro Rivadavia District)														
Astra	Compañía Astra de Petroleo	17	..	2	19	60,687	18	1	2	21	70,391	4	2	6
Costa														
Escalante														
Campamento Sud	Yacimientos Petroliferos Fiscales (Y.P.F.)	56	1	1	58	177,662	66	2	3	71	279,389	10	2	12
Col. Sarmiento														
El Trébol														
Kilometro 27	Cía. Diadema de Petroleo	28	1	1	30	106,328	29	..	2	31	104,859	4	4	8
Kilometro 8	Cía. Ferrocarrilera de Petroleo	26	3	5	34	60,626	..	..	1	1	.....	..	..	..
M. Rosales		..	..	1	1	11,125	20	..	1	21	82,917	3	..	3
Reserva		3	..	2	5	10,522	..	..	..	..	.....	..	..	..
Segundo		..	..	..	..	.....	1	..	1	2	4,799	..	..	..
Sindicato		1	..	1	2	745	6	..	..	6	19,063	..	..	..
Solano		1	1	2	4	6,968	..	..	..	..	.....	..	..	..
Wildcats		..	..	..	..	.....	1	..	1	2	5,604	..	..	..
MENDOZA:														
El Sosneado	Cía "El Sosneado"	1	..	..	1	6,110	..	..	..	..	.....	..	..	..
Tupungato	Y.P.F.	..	..	..	..	.....	..	..	1	1	6,010	..	..	..
Barrancas-Lunlunta		3	..	..	3	22,462	4	..	..	4	22,631	3	..	3
Wildcats		..	..	..	..	.....	1	..	..	1	8,113	..	..	..
NEUQUEN: (Plaza Huincul District)														
Dadin	Standard Oil Company	..	..	..	..	.....	..	..	..	..	.....	..	1	1
Plaza Huincúl		1	..	2	3	9,231	1	..	..	1	2,934	..	..	..
Plaza Huincúl	Y.P.F.	12	..	2	14	47,529	19	2	1	22	73,700	4	2	6
Wildcats		..	..	6	6	26,741	..	..	5	5	21,702	..	..	..
SALTA:														
Lomitas	Standard Oil Co., S. A. Argentina	1	..	..	1	1,288	1	..	..	1	2,185	..	..	..
San Pedro		..	..	..	..	.....	..	..	2	2	3,553	1	2	3
Tranquitas	Y.P.F.	2	..	1	3	9,214	6	..	..	6	13,109	2	..	2
Rio Pescado		1	..	..	1	4,790	1	..	..	1	4,593	..	1	1
Wildcats		..	..	2	2	8,098	..	..	1	1	3,037	..	..	..
SANTA CRUZ: (Caleta Olivia District)														
Cañodón Seco	Y.P.F.	4	..	..	4	23,267	5	..	..	5	27,329	4	..	4
Wildcats		4	..	..	4	26,951	3	..	..	3	18,478	..	..	..
Total		161	6	28	195	620,344	182	5	21	208	774,396	35	14	49

New members of the Magcobar *family of drilling mud products*

IN KEEPING with the Magcobar policy of providing the industry with a complete drilling mud service and the latest scientific developments in this field, we are proud to announce the addition of these proven oil mud products:

JEL-OIL, a ready-mixed straight oil mud, has a zero fluid loss which prevents water blocking in even the tightest low pressure sands. Jel-Oil has numerous applications — it is not seriously affected when drilling salt, anhydrite, lime and shale; the hole through all formations remains bit-size, and it contributes to a good cement job; it is a good lubricant, reducing rotary torque, circulating pressure and hole friction; bits last longer and fewer trips are required; and it is a valuable aid in obtaining unaltered cores.

VIS-CUTTER AND VIS-BOOSTER are chemicals for controlling properties of Jel-Oil Mud.

JEL-OIL "E," a ready-mixed emulsion compound which is easily added to conventional muds to give a stable oil emulsion mud, reduces torque and circulating pressure, speeds drilling, makes bits last longer and cuts down the number of trips. It also prevents hole trouble and water blocking of pay sands. Emulsion mud is low in cost.

"E" CONCENTRATE, an emulsifying and stabilizing agent in concentrated form, is mixed with diesel oil at the well for making emulsion muds. It effects economies in transportation and storage for isolated operations.

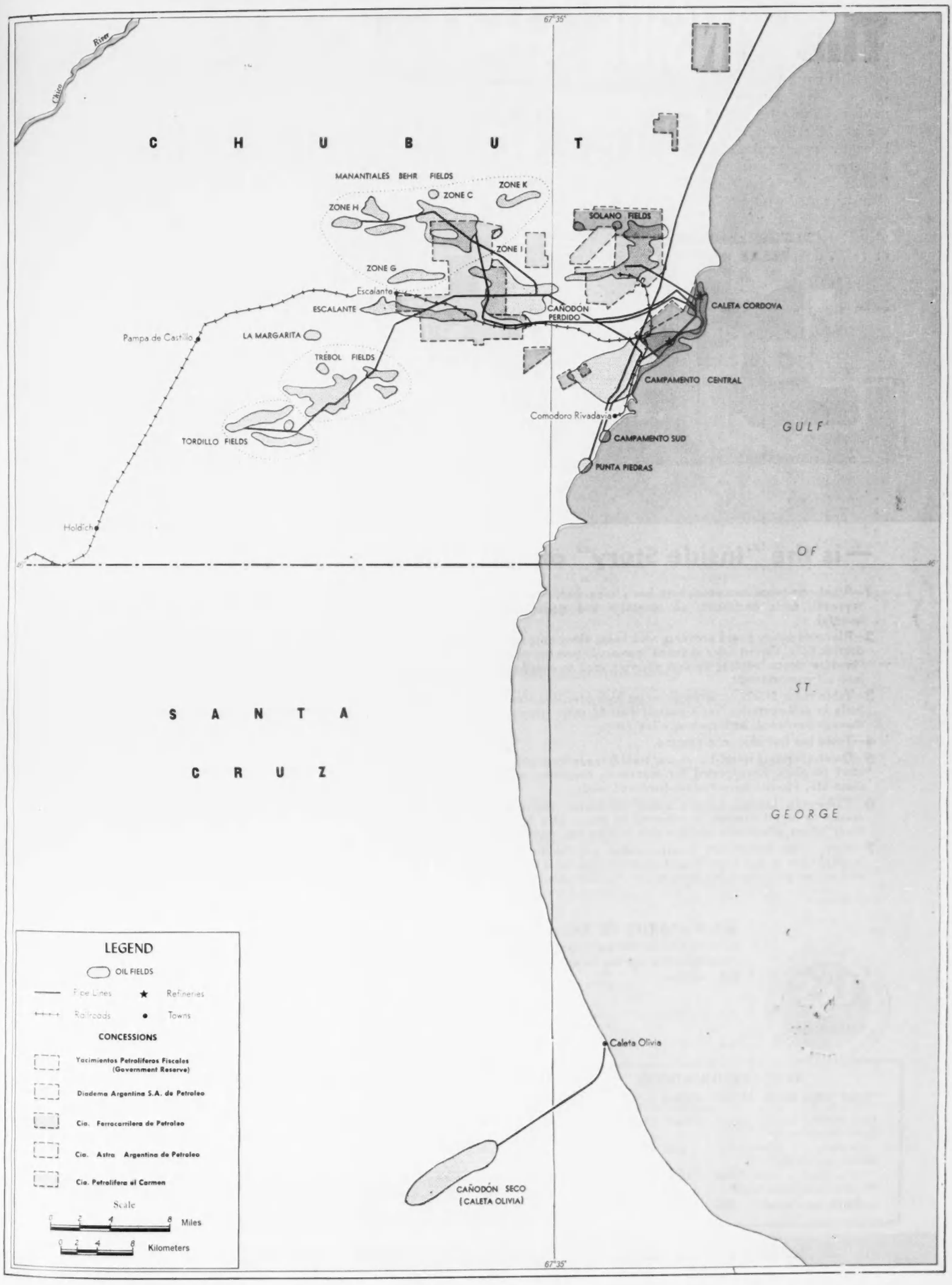
The composition of JEL-OIL and JEL-OIL "E" and their application in drilling are fully covered by licenses under patents held by the Shell Development Company and Halliburton Oil Well Cementing Company.

MAGNET COVE BARIUM CORPORATION

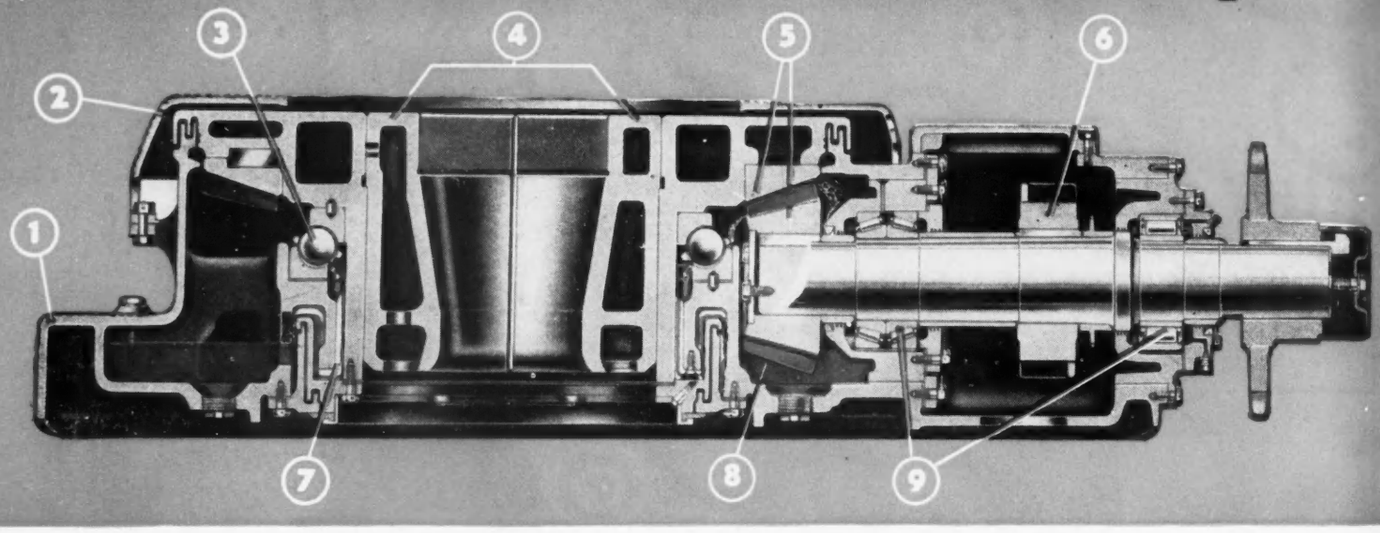
MALVERN, ARKANSAS • HOUSTON, TEXAS

Export Representative: Guy E. Daniels, 30 Rockefeller Plaza, New York, N. Y.

ARGENTINA—Comodoro Rivadavia Fields and Concessions



The "INSIDE STORY" of the "Oilwell" 20½-Inch Rotary



—is the "Inside Story" of ALL "Oilwell" Rotaries!

1—Rigid one-piece cast-steel base has pinion-shaft bearing supports, table enclosure, oil reservoir and skids cast integral.

2—Elevated safety guard prevents mud being slung onto the derrick floor. Flared sides of guard (patented) prevent mud "bridges" from building up and allowing mud to overflow into oil compartment.

3—Table turns freely on large-diameter high-precision steel balls in self-centering angle-contact bearing with races of through-hardened, high-carbon, alloy steel.

4—Table has full 20½-inch opening.

5—Quiet-operating spiral-bevel gear train is made from alloy-steel forgings, heat-treated for maximum toughness and wear-life. Pinions have surface-hardened teeth.

6—Three-way locking against either clockwise, counter-clockwise or all rotation is achieved by means of a hand lever which selectively engages this locking-dog wheel.

7—Extra-wide, heavy-duty bronze radial and hold-down bushing, low in the base, is continuously submerged in oil and serves as a steadying bearing for the turntable, while absorbing upward thrust. Foreign matter from blowouts is prevented from entering the rotary by a labyrinth and flexible sealing ring.

8—12-gallon capacity oil reservoir extends completely around table. It is sealed at the top by an improved labyrinth and at the bottom by a hold-down ring that is bolted to and rotates with the turntable. The lip of the hold-down ring overlaps the retaining ring, thus assuring the return of all oil to the oilbath at any speed. The pinion, dipping in the oilbath, carries oil to the bevel gear, where it is sprayed continuously to the main bearing from where it flows to submerge the hold-down bearing.

9—Compact and sturdy pinion-shaft assembly is mounted at the pinion end in opposed heavy-duty tapered roller bearings, designed for both radial and thrust loads, and at the sprocket end in a heavy-duty straight roller bearing. Both bearing housings are grease-packed. The pinion shaft bearings, lockwheel, tachometer-drive sprocket and spacers are locked endwise on the large-diameter shaft in such a manner that either bearing assembly can be removed without stripping the entire shaft.

***ALL ROTARIES IN THE "OILWELL" LINE** are similar in general construction—differing only in size and capacity. Your nearest "Oilwell" representative will gladly furnish complete information, to assist in selecting the Rotary best suited for your drilling requirements.*

OIL WELL SUPPLY COMPANY · USS · OILWELL · UNITED STATES STEEL

BRIEF SPECIFICATIONS

"Oilwell" Oilbath Rotaries	17½ A&B	20½-inch	21-A	27½-A
Gear Ratio	3.28:1	3.82:1	2.61:1	3.84:1
Rated Dead-Load Capacity ....tons	200	250	300	350
Recommended Max. Drlg. Depth...feet	9,000	13,000	17,000	17,000
Recommended Max. Table Speed .....r.p.m.	500	500	1,000	400

OIL WELL SUPPLY COMPANY

BRANCHES SERVING ALL OIL FIELDS

Executive Office—Dallas, Texas

Domestic Division Offices—Casper, Wyoming · Columbus, Ohio · Dallas, Texas
Houston, Texas · Los Angeles, California · Tulsa, Oklahoma

Export Division Offices—30 Rockefeller Plaza, New York 20, N. Y.
1204 Russ Building, San Francisco 4 California
Dashwood House, 69 Old Broad Street, London E. C. 2, England

Field Representation—San Fernando, Trinidad · Maracaibo, Venezuela
Rio de Janeiro, Brazil · Buenos Aires, Argentina · Lima, Peru

UNITED STATES STEEL

"OILWELL"

ARGENTINA—Continued

enlarge them and increase reserves, but YPF is now beginning to give more attention to remote areas. Early in 1948 wildcats were being drilled in localities widely scattered through the nation on prospects selected by geological and geophysical work. Almost all of the 12 wildcats actually completed during 1947 were fairly close to producing areas, but 1948 and later years will see more wildcats drilled.

Late in 1947 a conference was held between the Argentine government and Glenn H. McCarthy, American independent operator, on a tentative plan whereby McCarthy would take active charge of a substantial part of the development and expansion program, but no agreement was reached. Apparently the government has substituted the plan of employing outside contractors for specific parts of the overall program and will retain direction of all activities.

Wildcats Completed in Argentina

Province	Company, Well and Location	Date Completed	Total Depth (Ft.)	Results
Chubut:	Compañía Ferrocarrilera de Petroleo, Well D.A. 243, 9 miles west of Comodoro Rivadavia -M Rosales Area	5-27	4942	6.2 bbls. dav. Pampa Castillio formation.
	C.F.P., Well 638, Kilometro 8 Area	1-3	662	Abandoned
Mendoza:	Y.P.F.'s Barrancas B-21, Barrancas Area	4-26	8113	Productive, no gge.
Neuquén:	Y.P.F.'s NA-27, Challacó Area	6-15	3573	Productive, no gge.
	Y.P.F.'s NA-96	8- 3	4137	Proudctive, no gge.
	Y.P.F.'s NA-14	10- 3	3268	Dry and abnd.
	Y.P.F.'s Senillosa NS 6	11-23	5974	Dry and abnd.
	Y.P.F.'s P. Trill 2	3-27	3750	Dry and abnd.
Salta:	Y.P.F.'s Solazutti S4	12- 4	3037	Dry and abnd.
Santa Cruz:	Y.P.F.'s O-21, Caleta Olivia Ext.	5- 5	6319	Productive
	Y.P.F.'s O-23	5-31	5971	Productive
	Y.P.F.'s O 35	11- 8	6188	Gas Well
Total...	12 wells		55,424	

Pipe Lines of Argentina

Area and Company	Origin	Terminus	Length (Miles)	Diameter (Inches)	Capacity of Line (Bbls. Daily)
CRUDE LINES					
Chubut					
YPF	El Tordillo	El Trébol	3.7	8	15,725
	El Trébol	Escalante	6.8	8	18,870
	Escalante	Cañadón Perdido	8.9	8–10	22,000
	Cañadón Perdido	Km. 9	5.8	7-8 9–10	28,300
	Km. 9	Caleta Córdova	6	8	25,160
	Km. 9	Km. 5	3.5	9–10	25,160
	Km. 5	Km. 3	2.3	8–10	25,160
	Campamento Sur	Km. 3	2.7	5	6,290
	Manantiales Behr	C. Perdido	8.9	6–8	12,580
Astra	Field	C. Córdova	4.8	8	21,385
	Km. 23	Field	9.3	6	12,580
Diadema	Km. 27	Caleta Olivares	13.6	6	15,750
Ferrocarrilera	Manantial Rosales	Km. 8	7.5	6	12,580
	Km. 8	C. Córdova	4.7	6	12,580
	Km. 8	Km. 3	3.7	6	12,580
	Mina Solano	Km. 8	18.6	6	12,580
Neuquen					
YPF	Field	Est. Challacó	3.9	4–6	9,400
Standard Oil Co.	Huincul	Dadin	7	3–6	2,000
	Dadin	Challacó	9	3–4	4,800
Mendoza					
YPF	Tupungato	Est. Anchoris	10.4	8	18 870
	Barrancas	Agrelo	9.3	3–4	3,100
Salta					
YPF	Río Pescado	Oran	16.8	4	3,775
	Tranquitas	Vespúcio	3.7	3	1,885
Standard Oil Co.	Agua Blanca	Elordi	41.5	3	1,195
	San Pedro	Lomitas	16.3	4	3,900
	Lomitas	Vespucio	3.8	4	5,150
	Vespucio	Hickman	46	4–5–6	5,000
	Hickman	Elordi	37	4	2,500
Santa Cruz					
YPF	Cañadón Seco	Caleta Olivia	11	6	6,000
GAS LINES					
Dirección Generál Gas del Estado	Comodoro Rivadavia	Buenos Aires	1,100	10	35 mln.[1]
	Luján de Cuyo	Mendoza	37.2	3–4	.....
	La Plata	Buenos Aires	37.2	6	.....

[1] Under construction. [2] Refinery gas.

Engineering and Geological Data on Argentina Fields

Province and Field	Est. Proved Area (Acres)	Gravity Oil (API)	PRODUCING FORMATION			Depth of Wells (Feet)		Average Thickness of Pay (Ft.)	Type Structure
			Local Name	Kind	Geologic Age	Minimum to Top of Pay	Maximum Total Depth of Wells		
SALTA:									
Agua Blanca	49	22.5	Gondwana Inf.	Sand	Permian	2300	3600	33	Anticline
Tartagal	40	45	Gondwana Inf.	Limestone, Sand	Permian	....	....	..	Anticline
Lomitas	550	43	Tarija	Lime	Permian	....	....	..	Anticline
Ramos	30	54	Devonico	Sand	Devonian	2900	3930	30	Faulted Anticline
San Pedro	494	43	Gondwana Inf.	Sand	Permian	1800	3300	60	Anticline
Río Pescado	62	49	Terciario	Sand	Tertiary	4175	4376	103	Anticline
Tranquitas	3053	..	Gondwana Tillita	Lime	Permian	1950	2350	200	Faulted Anticline
NEUQUEN (Plaza Huincul District):									
Huincul	2172	29.2	Dogger	Sand	Jurassic	2200	2500	26	Anticline
Dadin	525	32.5	Dogger	Sand	Jurassic	1990	2320	40	Stratigraphic trap
Centro Octógono	150	32	Dogger	Sand	Jurassic	1880	1950	40	Monocline
Oeste Octógono	1800	31.5	Dogger	Sand	Jurassic	2300	2365	33	Monocline
Laguna Colorada	750	33.5	Dogger	Sand	Jurassic	2450	2610	56	Monocline
Bajo de los Baguales	300	38.5	Dogger	Sand	Jurassic	3383	3386	20	Monocline
Challacó	1688	22.5	Dogger	Sand	Jurassic	3300	3425	66	Faulted Anticline
MENDOZA:									
Sosneado	150	12.9	Victor	Sand	Triassic	544	551	..	Monocline
Tupungato	645	30	Victor	Sand	Triassic	5870	6310	69	Anticline
Cacheuta	700	31	Victor C y Potrerillos	Sand	Triassic	1940	3080	13	Monocline
Lunlunta (Barrancas)	1446	28	Potrerillos	Sand	Triassic	7720	7890	45	Anticline
CHUBUT (Comodoro Rivadavia District):									
Costa	13840	20	Glauconitico	Sand	Upper Cretaceous	1815	2805	30	Faulted Anticline
Escalante	18640	23.5	Glauconitico	Sand	Upper Cretaceous	2260	4290	33	Faulted Anticline
Campamento Sud	300	20	Glauconitico	Sand	Upper Cretaceous	1917	2300	26	Anticline
Col. Sarmiento	20	23	Glauconitico	Sand	Upper Cretaceous	2310	2640	26	Faulted Anticline
El Trebol	14500	23	Glauconitico	Sand	Upper Cretaceous	3878	5960	33	Faulted Anticline
Kilometro 27	8975	24	Glauconitico	Sand	Upper Cretaceous	3088	3372	26	Anticline
Kilometro 8	3900	19	Glauconitico	Sand	Upper Cretaceous	1675	1965	50	Faulted Anticline
M. Rosales	2400	19	Glauconitico	Sand	Upper Cretaceous	1975	3900	26	Faulted Anticline
Segundo	90	19	Glauconitico	Sand	Upper Cretaceous	2300	3970	30	Anticline
Solano	5000	20.6	Glauconitico	Sand	Upper Cretaceous	1540	2920	35	Faulted Anticline
Reserva	75	19.5	Glauconitico	Sand	Upper Cretaceous	1750	1985	15	Anticline
Sindicato	415	19	Glauconitico	Sand	Upper Cretaceous	2965	3030	15	Anticline
Astra	2965	22.3	Glauconitico	Sand	Upper Cretaceous	1740	3280	50	Faulted Anticline
SANTA CRUZ									
Canodon Seco	4000	30.6	.....	Sand	Jurassic	4085	5612	10	Faulted Anticline

Longer Life Lower Costs

WHEN YOU USE

Outstanding quality is never a matter of chance, consequently there are definite reasons for the consistent top-flight performance of Preformed "HERCULES" (Red-Strand) Wire Rope. Material . . . design . . . experience . . . fabrication . . . pre-forming —all are contributing factors that add up to its plus value, which mean longer life and lower operating costs.

Verifiable FACTS *About* PRE-FORMED PERFORMANCE

1. As broken wires lie practically flat, they are not so apt to injure hands of the men handling it. Also, there is less possibility of an "out of place" wire causing damage to adjacent wires in the rope.
2. It is more flexible, which combined with its inert qualities, make for smoother spooling . . . faster handling.
3. The preforming process reduces the tendency of Lang Lay wire rope to loop and squirm—thereby making it possible to utilize the many basic advantages of Lang Lay for more purposes.
4. As the wires and strands are shaped to the normal form they occupy in the rope, there is less turning and twisting . . . less wear . . . longer life.

"HERCULES"* (RED STRAND) the DEPENDABLE WIRE ROPE for any TOUGH JOB

* REG. U.S. PAT. OFF.

MADE ONLY BY

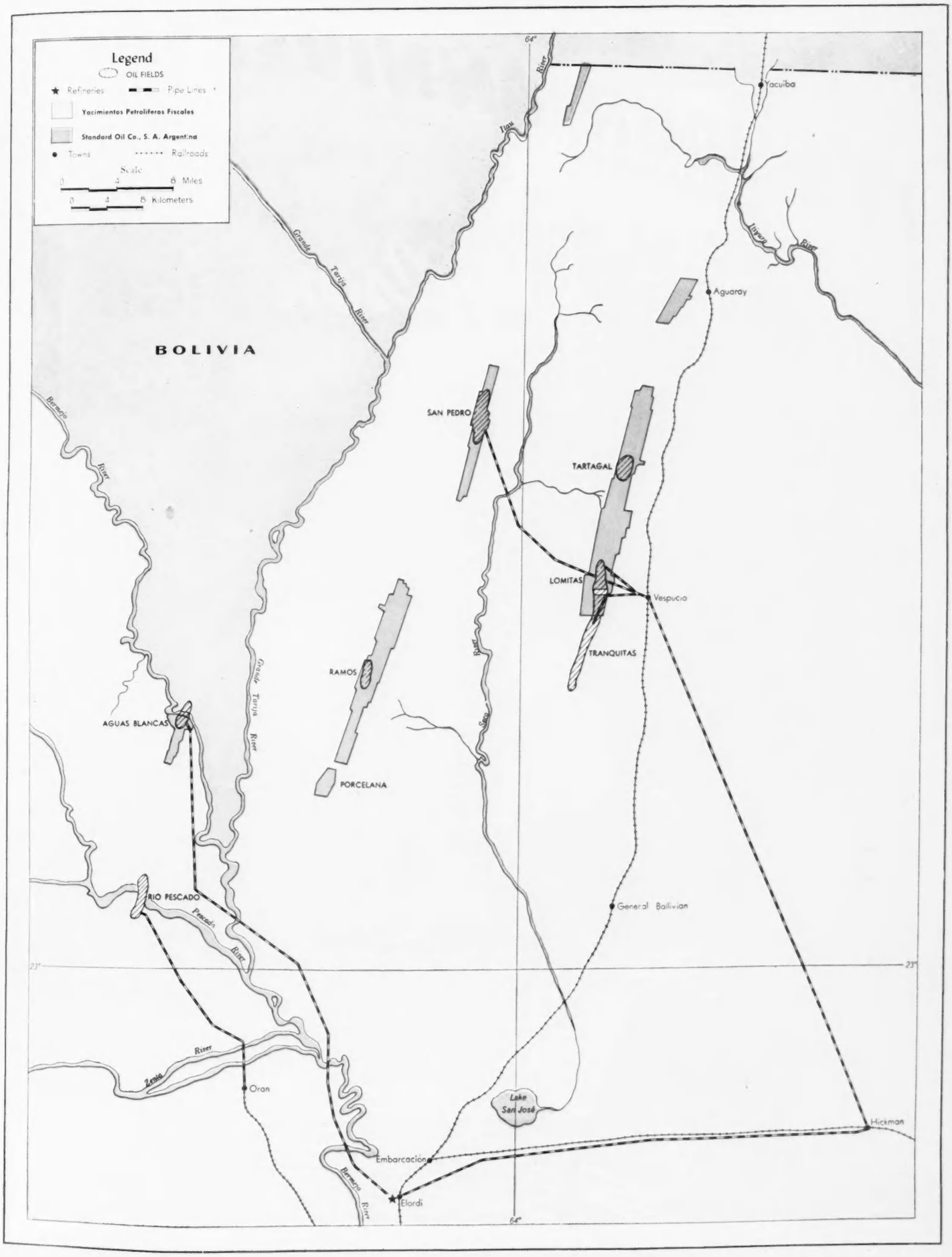
A. LESCHEN & SONS ROPE CO.

ESTABLISHED 1857

5909 KENNERLY AVENUE • ST. LOUIS 12, MISSOURI

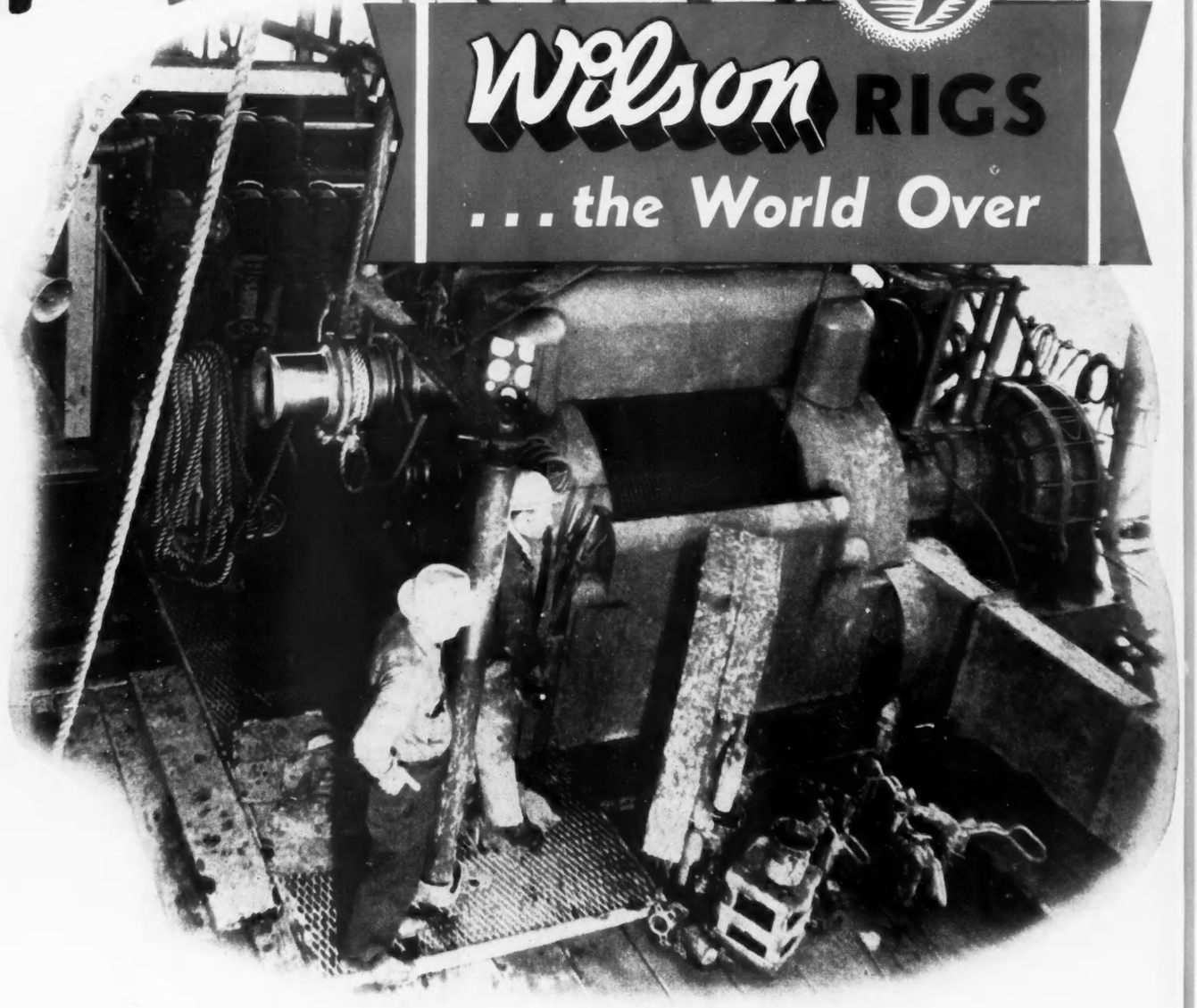
NEW YORK 6 • CHICAGO 7 • HOUSTON 3 • DENVER 2
LOS ANGELES 21 • SAN FRANCISCO 7 • PORTLAND 9 • SEATTLE 4

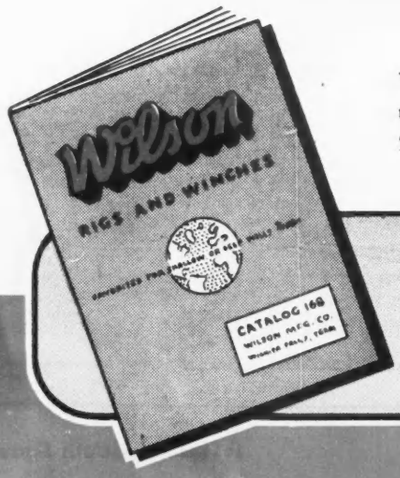
ARGENTINA—Salta Fields and Concessions



IT'S YOUR ANNIVERSARY

Wilson RIGS ... the World Over

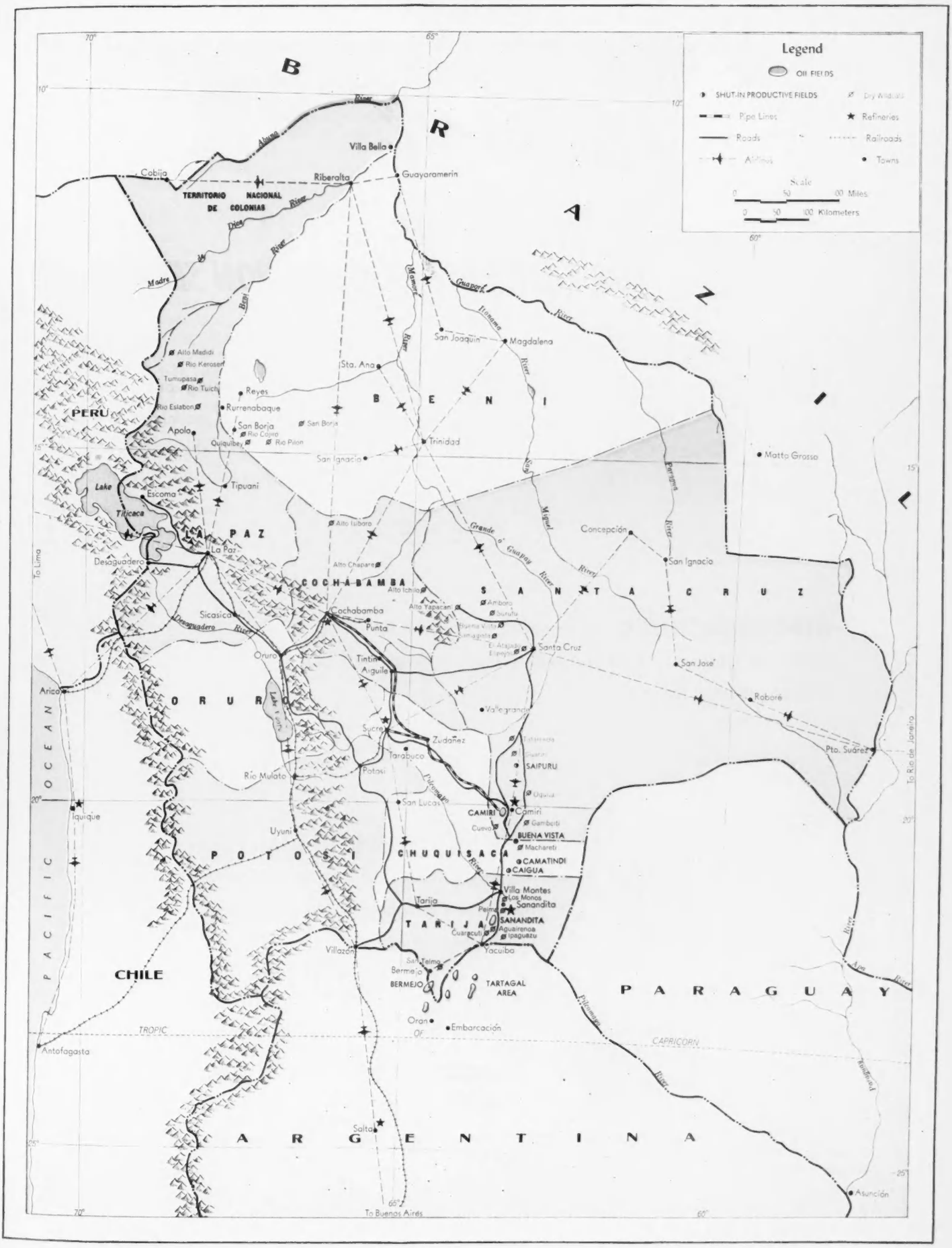




Wilson Super Titan Rig in action. This rig has the power to drill to 21,600′ using 3½″ drill pipe. Choice of two drum sizes — 56″ and 66″ diameter.

Write today for your copy of the Wilson Silver Anniversary Catalog. Contains all specifications and data on Wilson Rigs and Winches and information on new developments.

BOLIVIA


Legend
OIL FIELDS
SHUT-IN PRODUCTIVE FIELDS
Dry Wildcats
Pipe Lines
Refineries
Roads
Railroads
Airlines
Towns
Scale
0 50 100 Miles
0 50 100 Kilometers
B R A Z I L
PERU
CHILE
P A R A G U A Y
A R G E N T I N A
PACIFIC OCEAN
Villa Bella
Cobija
Riberalta
Guayaramerin
TERRITORIO NACIONAL DE COLONIAS
Beni River
Abuna River
Madre de Dios River
Mamoré River
Guaporé River
Itonama River
Alto Madidi
Rio Kerosen
Tumupasa
Rio Tuichi
Rio Esteban
Reyes
Rurrenabaque
San Borja
Rio Cairo
Rio Pilon
Apolo
Quiquibey
Sta. Ana
San Joaquin
Magdalena
Trinidad
San Ignacio
Matto Grosso
Lake Titicaca
Escoma
Tipuani
Alto Tuibaro
La Paz
Desaguadero
Alto Chapare
Concepción
San Ignacio
Grande o Guapay River
Alto Ichilo
Alto Yapacani
Amboro
Sicasica
Cochabamba
Punta
Santa Cruz
San José
Oruro
Tintin
Aiguile
Arica
Roboré
Valle grande
Sucre
Zudañez
Tarabuco
Pto. Suárez
Río Mulato
Potosi
SAIPURU
San Lucas
Iquique
CAMIRI
Camiri
Uyuni
BUENA VISTA
Machareti
CAMATINDI
CAIGUA
Villa Montes
Los Monos
Sanandita
SANANDITA
Aguairenoa
Ipaguazu
Tarija
Cuarecuti
Yacuiba
Villazón
Bermejo
TARTAGAL AREA
Oran
Embarcación
Antofagasta
Salta
Asunción
To Lima
To Buenos Aires
To Rio de Janeiro
TROPIC OF CAPRICORN

it takes all

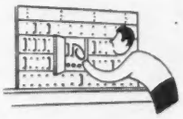
FOR COMPLETE EXPLORATION SERVICE

1

Field Equipment and operating personnel especially adapted to meet the physical problems presented by each area and thereby to obtain the most rapid coverage under any given conditions.

Instrumentation to overcome the technical difficulties inherent in each area and thereby to obtain data of optimum quality.

2



3

Interpretation and review of all data by thoroughly competent and experienced interpreters to insure the most accurate final presentation and guidance of your development program.

GARRETT EXPLORATION COMPANY

Republic Bank Building **DALLAS, TEXAS**

BOLIVIA

BOLIVIA'S crude oil production of 374,964 barrels for 1947 was only 11,265 barrels more than 1946, but completion of six wells during the year has added potential greater than the amount of production increase. Camiri Field, principal producing area, will not be able to flow its full potential before completion of the 375-mile pipe line system now being built to carry oil to Cochabamba, Sucre and other consuming centers. Meanwhile Yacimentos Petrolíferos Fiscales Bolivianos, the government operating agency, is concentrating on drilling to build up a supply for the lines. Refineries to be built at Cochabamba and Sucre with capacities of 5000 and 3000 barrels respectively, will process the production.

Late in the year YPFB discovered the first new oil field found since the industry was nationalized, opening production at Guayrúy, 15 miles south of Camiri, producing 300 barrels of 57-gravity oil daily from Devonian at 1731 feet. In addition a new producing horizon was found at Camiri field through deepening an old well about 300 feet.

Drilling progress has been slow in recent years since all wells were drilled with cable tools, and parts have been difficult to secure. Average drilling time has been very near a year for each well. During 1947 two medium duty steam rotary rigs were placed in service, the first rotary well being completed in three months even though crews were unfamiliar with rotary operations.

A Congressional committee failed to approve the contract with Superior Oil Company for an exploration concession on 10 million acres in southeastern Bolivia, stating no more than one-fourth this area should be allowed any one company, and that Bolivia was willing to accept proposals on that basis. General terms call for a 7-year exploration and 55-year exploitation period, a percentage of acreage being selected after exploration. Superior has expressed reluctance to contract for a smaller area.

We gratefully acknowledge the cooperation of Guillermo Mariaca, Gerente General of YPFB in furnishing data on Bolivia's industry.

Oil Production and Producing Wells in Bolivia

Dept. and Field	Year of Discovery	Producing Oil Wells End of 1947			CRUDE OIL PRODUCTION (Barrels)			
		Flowing	Art. Lift	Total Produc'g	Daily at End of 1947	Year 1946	Year 1947	Cumulative Through 1947
Chuquisaca								
Camatindi*	1928	Inactive			.....	.....	.....	11,875
Santa Cruz								
Camiri	1927	8	1	9	471	128,495	163,465	1,551,195
Tarija								
Bermejo	1927	4	2	6	335	113,034	100,159	687,482
Sanandita	1926	4	6	10	313	121,170	111.340	1,517 434
Totals		16	9	25	1,119	362,699	374,964	3 767,986

* Not now produc ng.

Drilling in Bolivia

Department and Field	Operating Company	Wells Completed in 1946					Wells Completed in 1947					Wells Drilling and Shut Down at End of 1947		
		Oil	Gas	Dry	Total Wells	Total Footage	Oil	Gas	Dry	Total Wells	Total Footage	Drlg.	SD.	Total
Santa Cruz														
Camiri	Yacimientos Petrolíferos Fiscales Bolivianos	1	..	..	1	266	3	..	..	3	9137	6	4	10
Wildcats		..	..	..	..	.....	1	..	..	1	1731	2	..	2
Tarija														
Bermejo		..	..	..	..	.....	1	..	..	1	2319	1	..	1
Sanandita		2	..	..	2	4860	1	..	..	1	2657	1	..	1
Total		3	..	..	3	5126	6	..	..	6	15,844	10	4	14

Engineering and Geological Data on Bolivia Fields

Department and Field	Est. Proven Area (Acres)	Gravity of Oil A.P.I.	Name	Kind	Age	Depth (Ft.) Minimum to Top of Pay	Depth (Ft.) Maximum to Bottom of Pay	Average Thickness of Pay (Ft.)	Structure
Chuquisaca									
Buena Vista*	1,475	43.5	.....	Sand	Devonian	.....	3165	.....	Elongated Dome
Caigua*	.....	.....	.....	.....	.....	.....	.....	.....	Anticline
Camatindi*	1,120	41.5	.....	Sand	Devonian	2350	4300	.....	Faulted Anticline
Santa Cruz									
Camiri	640	53.1	Iquiri	Sand	Devonian	.....	3200	100	Anticline
Guairuy	.....	57.8	Guairuy	Sand	Devonian	1731	?	?	Anticline
Saipuru*	740	40	.....	Sand	Devonian	500	.....	.....	Anticline
Tarija									
Bermejo	600	25.7	Tarija	Sand	Permi-Triassic	2214	3600	.....	Anticline
Sanandita	200	41.5	Totora	Sand	Permi-Triassic	200	2100	.....	Anticline
Total	4,775								

*Inactive fields.

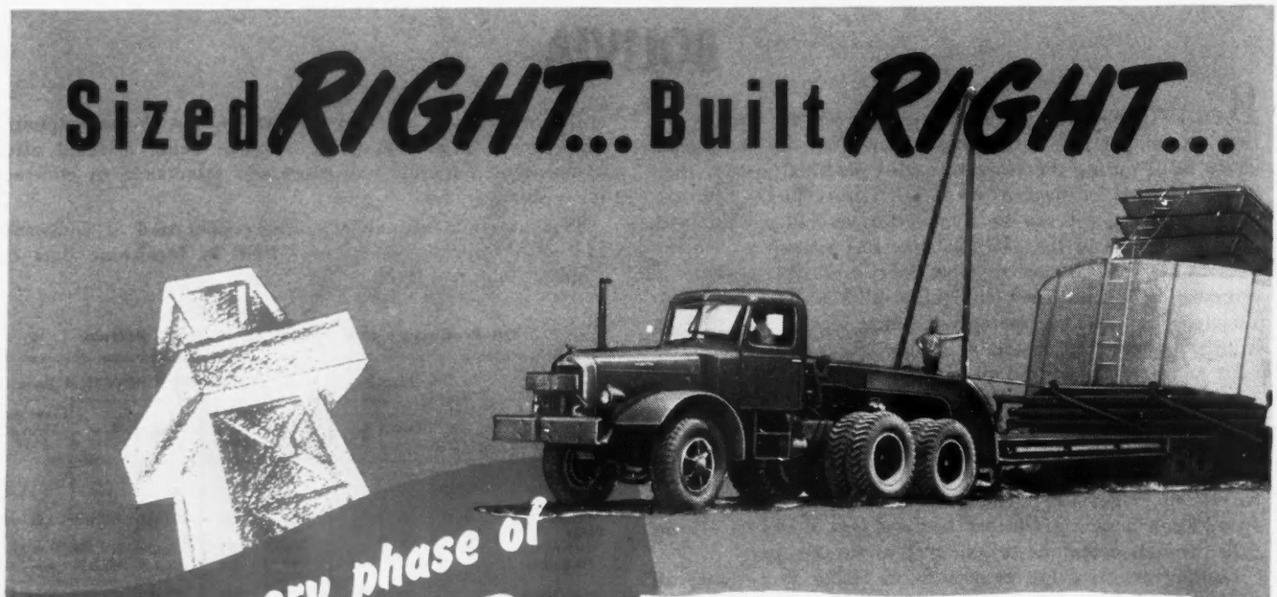
BRAZIL

A NEW petroleum law to make it possible for foreign capital to participate in Brazil's oil industry was drafted during 1947 and sent to the Congress early in 1948. It was not encouraging in its original form, containing many restrictive provisions which lessen its appeal to outside investors, but may attract some activity in view of the critical need for new Western Hemisphere reserve. Terms of the proposed statute include: Maintenance of stocks equivalent to three years domestic consumption; export of oil only after local needs are filled; contribution of 10 to 14 percent of production value to the petroleum fund; turning over all assets invested in a concession at the end of 40-year period; Foreign operators to have no part in refining and transportation.

A new field at Dom Joao, northwest of Candeias, was opened in April, producing 300 barrels daily from a depth of only 900 feet, and with probable area estimated at around 3000 acres ultimately. Faulting of the structure apparent in the fifth well may reduce this area somewhat. Drilling in the Bahia area resulted in completion of 26 wells during 1947, of which 22 were producers, most of them in the Candeias field.

Production reached the highest point in the nation's eight-year producing history, although the total of 96,806 barrels is more indicative of drilling activity than of producing capacity since the oil has only been used for field purposes. A potential

Sized RIGHT... Built RIGHT...



For every phase of OIL FIELD HAULING

All over the globe . . . wherever there's oil . . . no matter how tough the terrain—you'll find rugged Mack trucks giving masterful performance; winning stand-out preference with leading oil field operators.

For every phase of oil field hauling, there's a Mack truck sized right and built right to do the job as only a Mack can do it — with unmatched economy and enduring reliability. Macks are in there every step of the way . . . hauling scientific exploration equipment, carrying drill rigs, cementing units, draw works, casing, boilers, power units — whenever the load calls for greater capacity, power, strength and flexibility.

Macks have established an outstanding record in oil field work because they bring to the job advantages offered by no other truck. Powerful Thermodyne engines! Hydraulic Power Steering! Air Assist Clutch! Mack's famed Balanced Bogie and Power Divider! All are Mack exclusives that assure power and strength for the heaviest loads; flotation and traction for the most slippery mud or sand.

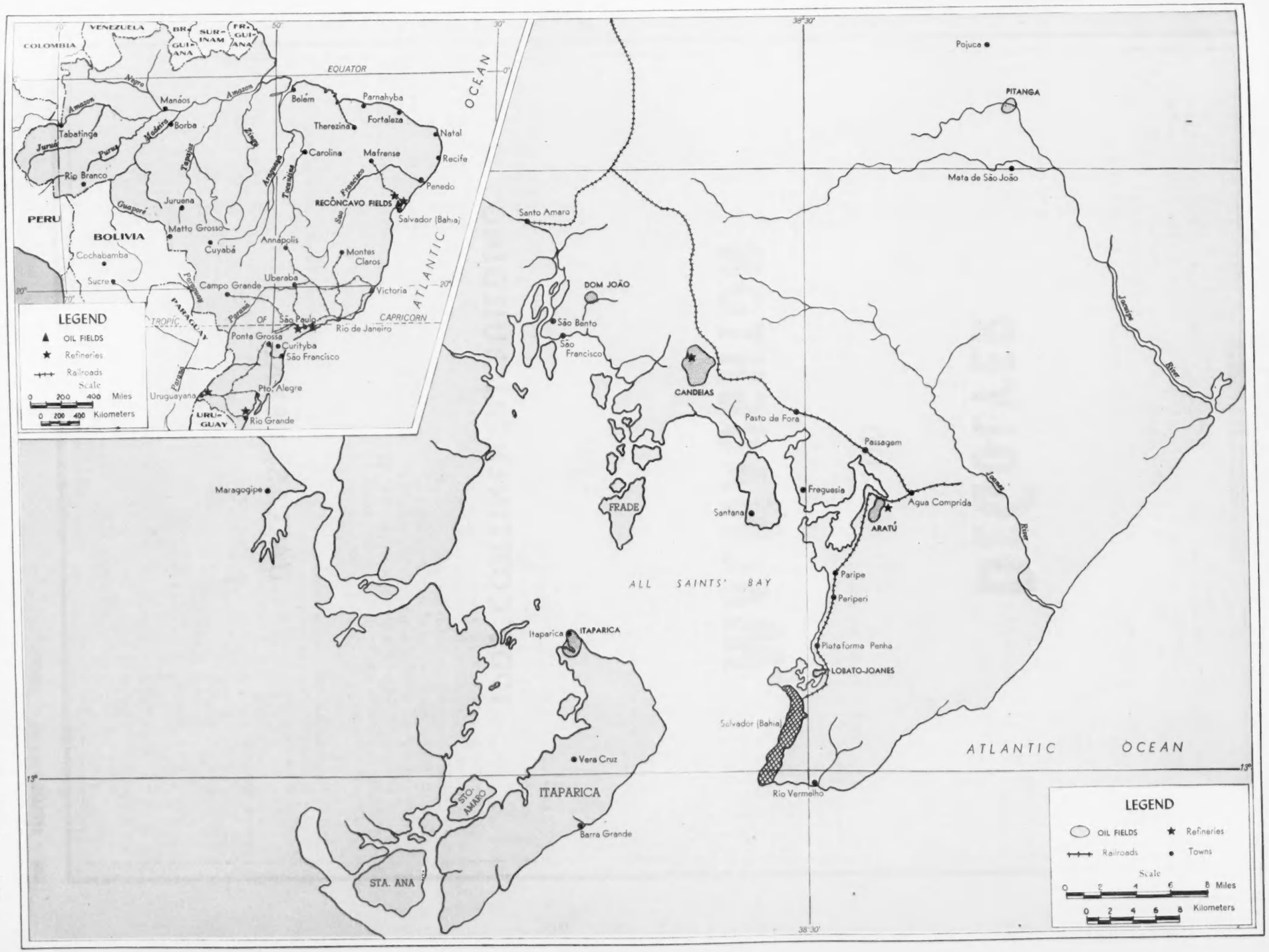
Our new bookiet, "Mack In The Oil Fields" gives you the full story. A copy is yours, on request.

Mack

since 1900, America's Hardest-Working Truck

Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts. In Canada, Mack Trucks of Canada, Ltd.

6507



BRAZIL—Reconcavo Fields

DEGOLYER

AND

MACNAUGHTON

☆

1000 CONTINENTAL BUILDING

☆

DALLAS, TEXAS

BRAZIL—Continued

of perhaps 3000 barrels daily has been built up at Candeias, but no tests have been run under production conditions.

A 2500-barrel refinery in the Candeias area has been scheduled to start building sometime late in 1948.

Six field geological parties and two seismograph geophysical crews have been working in Brazil for more than a year, most of the 1947 activity being of reconnaissance nature, with detailed work scheduled for 1948 and 1949.

Drilling in Brazil

State and Field	WELLS COMPLETED IN 1946					WELLS COMPLETED IN 1947				
	Oil	Gas	Dry	Total Wells	Total Footage	Oil	Gas	Dry	Total Wells	Total Footage
Bahia										
Aratú	...	...	...	...	.....	...	...	...	...	.....
Candeias	2	...	...	2	5,092	17	...	1	18	55,377
Dom João	...	...	...	...	.....	4	...	1	5	5,968
Itaparica	...	...	...	...	.....	...	1	...	1	5,100
Lobato-Joanes	...	...	...	...	.....	...	...	...	...	.....
Pitanga	1	...	1	2	7,555	...	...	2	2	5,074
Total	3	...	1	4	12,647	21	1	4	26	71,519

Refineries of Brazil

Company	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Dai'y)	Type of Refinery	Operating Status
Indústria Matarazzo do Energia, S.A.	São Paulo	830	None	Skimming	Operating
Ipiranga, S.A. Companhia Brasileira do Petróleos	Rio Grande do Sul	1000	None	Skimming	Operating
Cía Distilaria Riograndense do Petróleo	Uruguayana	415	None	Skimming	Operating
Conselho Nacional do Petróleo (Government)	Aratú Field	150	None	Skimming	Operating
Conselho Nacional do Petróleo (Government Pilot Plant)	Candeias Field	150	None	Skimming	Operating
Total	5 Plants	2545	None		

Oil Production, Producing Wells and Geological Data on Brazil Fields

State and Field	Year of Discovery	PRODUCING WELLS END OF 1947			CRUDE OIL PRODUCTION (Barrels)				Proved Area (Acres)	Gravity (API)	Name	Kind	Age	Depth (Feet)		Average Thickness of Pay (Feet)	Type of Structure
		Flowing	Art. Lift	Total Prod.	Daily at End of 1947	Year 1946	Year 1947	Cumulative Through 1947						Min. to Top of Pay	Max. to Bottom of Pay		
Bahia																	
Aratú	1942		2	2	10	4,540	2,741	51,515	75	43	Bahia	Sand	Cret.	1460 1949	5816	66 164	Anticline
Candeias	1941	9	27	36	300	52,603	84,720	218,186	890	26-36	Bahia	Sand	Cret.	2265 2955	6008	33	Flt. Ant.
Dom João	1947	...	4	4	Shut In	.....	2,073	2,073	100	39	Bahia	Sand	Cret.	898	....	131	Anticline
Itaparica	1942	9	6	15	Shut In	9,764	111	52,346	190	20	Bahia	Sand	Cret.	1740 2430	5025	26 25	Anticline
Lobato-Joanes	1939	...	2	2	25	Shut In	7,077	62,538	.....	33	Bahia	Sand	Cret.	1050	7365	.....	Anticline
Pitanga	1945	...	1	1	Shut In	317	84	401	.....	26	Bahia	Sand	Cret.	4865	.....	8	Anticline
Total		18	42	60	335	67,224	96,806	387,059									

CHILE

DRILLING in Chile's Cerro Manantiales (Spring Hill) field during 1947 resulted in further definition of the area with the result that there were four new oil wells drilled, to bring total to five, and two others were in the process of completion early in 1948. Following discovery in 1945, the next five wells drilled were disappointing, three being gas wells and two dry holes, with well No. 7, completed in September, 1947, as the second oil producer. Preliminary tests indicate individual wells capable of producing perhaps 700 barrels daily, so that the field now awaits only a pipe line outlet before it can start shipping oil. A 50-mile six-inch line has been authorized from Cerro Manantiales field to Caleta Percy where it can be loaded for tanker movement. Two rigs are to be kept active on Tierra del Fuego, and another is to start wildcatting on the mainland.

Exploration plans include, in addition to geological and geophysical surveys which have continued through the year, drilling two wildcat wells during 1948. One is to be on the Espora structure 8 miles north of Cerro Manantiales field, and another at San Sebastian 50 miles southeast of the field.

Corporacion de Fomento de la Produccion, under whose direction the oil industry is operated, has plans for a 10,000-barrel refinery in Central Chile, near Valparaiso, and in addition proposes to build a small plant in the Magallanes area.

Data on Wildcat Tests Drilled in Chile

AREA AND WELL[1]	Year Completed	Depth (Feet)	Formation at Bottom	REMARKS
Brunswick Peninsula				
Well No. A	1937	2135	Tertiary	Dry. Some gas shows.
Well No. B	1941	3017	Tertiary	Dry.
Well No. C	1936	4990	Cretaceous	Dry.
Well No. D	1936	5773	Tertiary	Dry.
Well No. E	1931	3838	Tertiary	Abandoned. Made some oil.
Well No. F	1931	2135	Tertiary	Dry.
Well No. G	1930	4560	Tertiary	Dry.
Well No. H	....	3394	.....	Drilling suspended.
Well No. I	1946	3279	Tertiary	Dry.
Well No. J	1945	1800	.....	Dry.
Tierra del Fuego				
Springhil 1	1945	7440	Undetermined	Discovery well of Cerro Manantiales Field. Flowed oil from 7419-38 feet. Well now shut in for storage.

[1] All wells drilled by Chilean government. Letters refer to designation of wells on accompanying map.

Data on Cerro Manantiales Field

Operating Company	Corporación de Fomento de la Producción
Year of Discovery	1945
Producing Wells—Oil	5 (Shut in)
Gas	3 (Shut in)
Production in 1947	None (Shut in, no outlet since discovery)
Wells Drilled in 1947—Oil	4
Gas	2
Dry	None
Total Wells	6
Footage Drilled	44,906
Field Wells Drilling—End of 1947	2
Estimated Proven Area of Field	400 Acres
Gravity of oil (A.P.I.)	39.2
Producing Formation	
Local Name	Cerro Manantiales
Kind	Sand
Age	Pre-Eagleford (Undetermined)
Minimum Depth to Top of Pay	7300 feet.
Maximum to Bottom of Pay	7400 feet.
Average Thickness of Pay	65 feet
Type Structure	Anticline

FROM WELL HEAD TO REFINERY

It's a National

ALL THE WAY

A Complete Line of Equipment for Above-Ground Handling of Well Products

WRITE FOR BULLETINS

CATALOG 51, SECTION 1
Low Pressure Separators

BULLETIN 201
Gas Dehydrators

CATALOG 66, SECTION 3
Indirect Heaters—High Pressure gas, Corrosive oils and waters

BULLETIN 67
Type IC Emulsion Treaters

BULLETIN 70
Type A Emulsion Treaters

CATALOG 65, SECTION 7
Free Water Knockouts

CATALOG 51, SECTION 2
High Pressure Separators

CATALOG 66, SECTION 1
Hi-Duty Heaters

CATALOG 66, SECTION 4
Portable Batch Heaters

BULLETIN 68
Type XYC-P & YC-P Emulsion Treaters

BULLETIN 71
Type IW Emulsion Treaters

BULLETIN 75
Armco-National Spiral Welded Casing

CATALOG 51, SECTION 3
Horizontal Separators

CATALOG 66, SECTION 2
Horizontal Heaters

CATALOG 66, SECTION 5
Heater Settling Tanks

BULLETIN 69
Type XC-P Emulsion Treaters

CATALOG 65, SECTION 8
Water Disposal Equipment

CATALOG 101
Wood Tanks

CATALOG 80
Welded Tanks

CATALOG 31
Bolted Tanks

ENGINEERED PRODUCTS NET ENGINEERED PERFORMANCE

SEND YOUR PROBLEMS TO OUR ENGINEERING STAFF

TYPICAL NATIONAL INSTALLATION
Oil and Gas Separator, XYC-P Emulsion Treater, Battery of Welded Storage Tanks

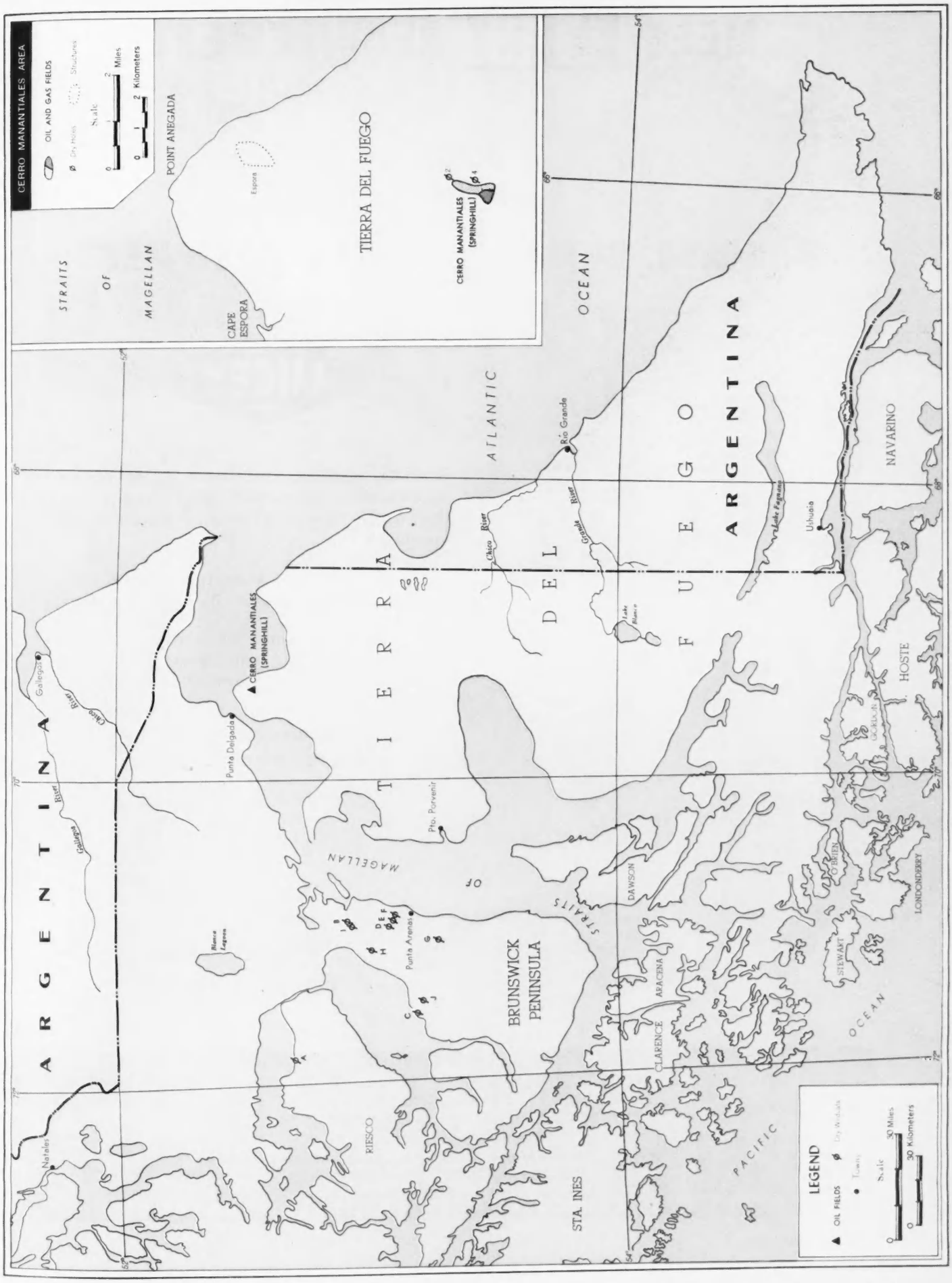
It's a National

NATIONAL TANK COMPANY

TULSA, OKLAHOMA.

EXPORT AGENT: NATIONAL SUPPLY EXPORT CORPORATION, 30 ROCKEFELLER PLAZA, NEW YORK, N. Y.

CHILE—Southern Oil Development

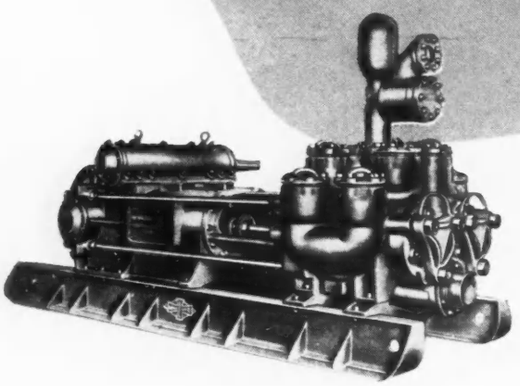


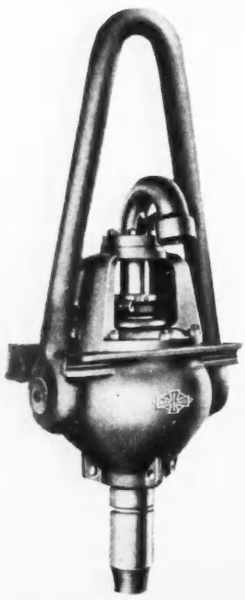
MEET EVERY REQUIREMENT

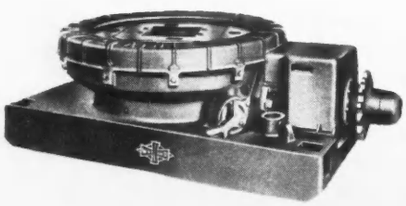
With

WHELAND ROTARY DRILLING EQUIPMENT

LUCEY





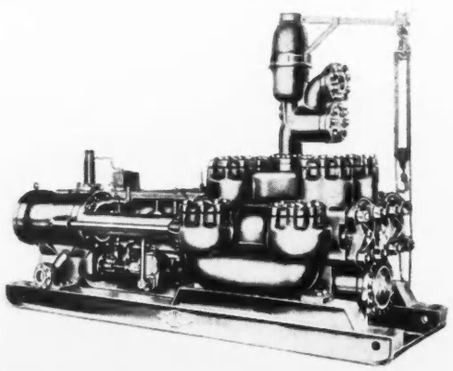


Wheland drilling equipment is of sturdy construction, permitting ease of inspection, thorough lubrication and simplicity of operation.

Every unit will give long-time, trouble-free, low cost service within its rated capacity.

The results of many years experience in designing, building and servicing drilling equipment is incorporated in Wheland design.

FOR FURTHER INFORMATION
WRITE FOR DESCRIPTIVE BULLETINS



EXCLUSIVE EXPORT DISTRIBUTOR

LUCEY EXPORT CORPORATION

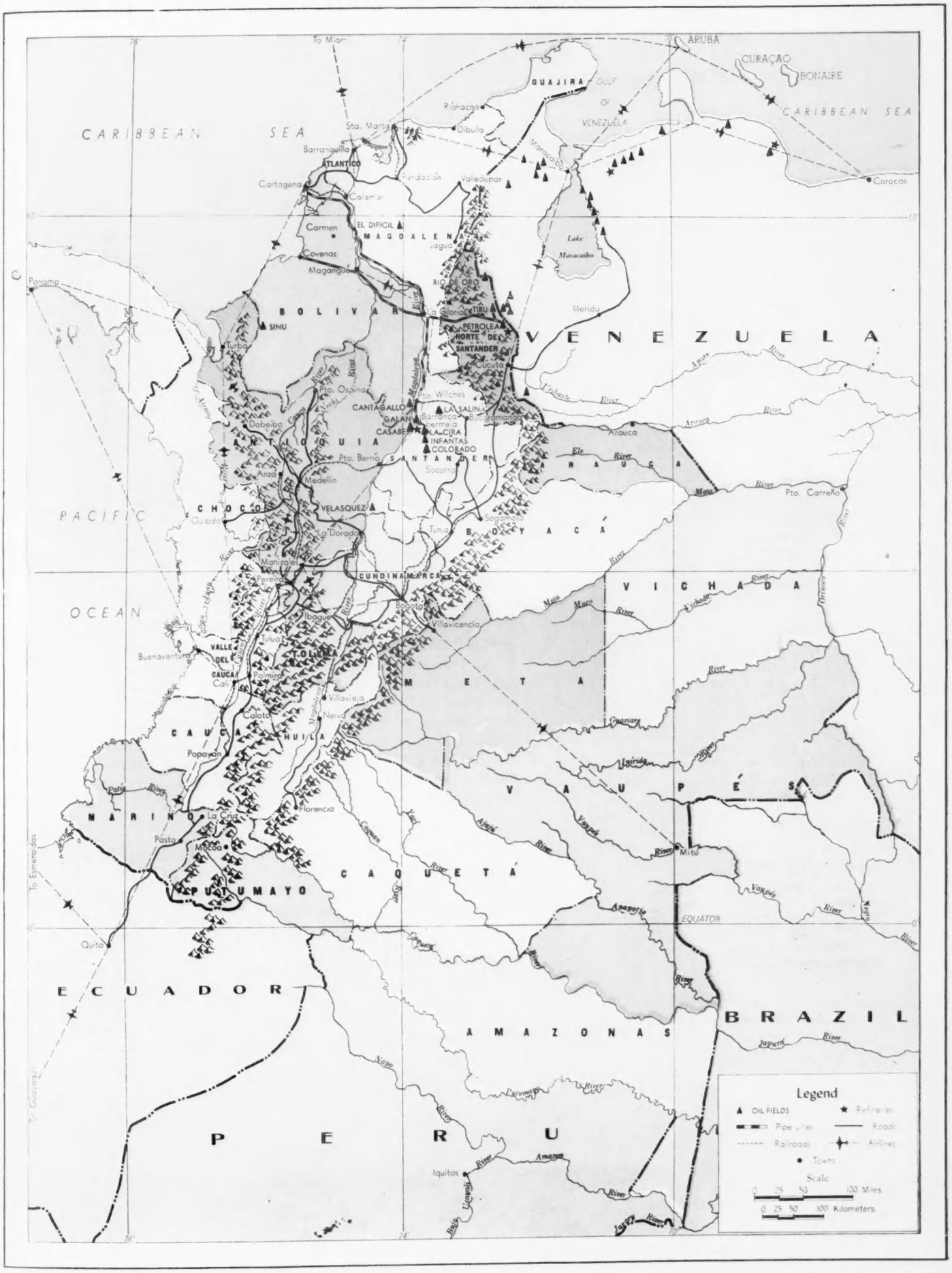
233 BROADWAY . . . NEW YORK 7, N. Y.

Broad Street House, London, E. C. 2, England ● 811 Sterling Building, Houston, Texas ● Calle Defensa 320, Buenos Aires, Argentine
San Fernando, Trinidad, B. W. I. ● 615 8th Avenue West, Calgary, Canada

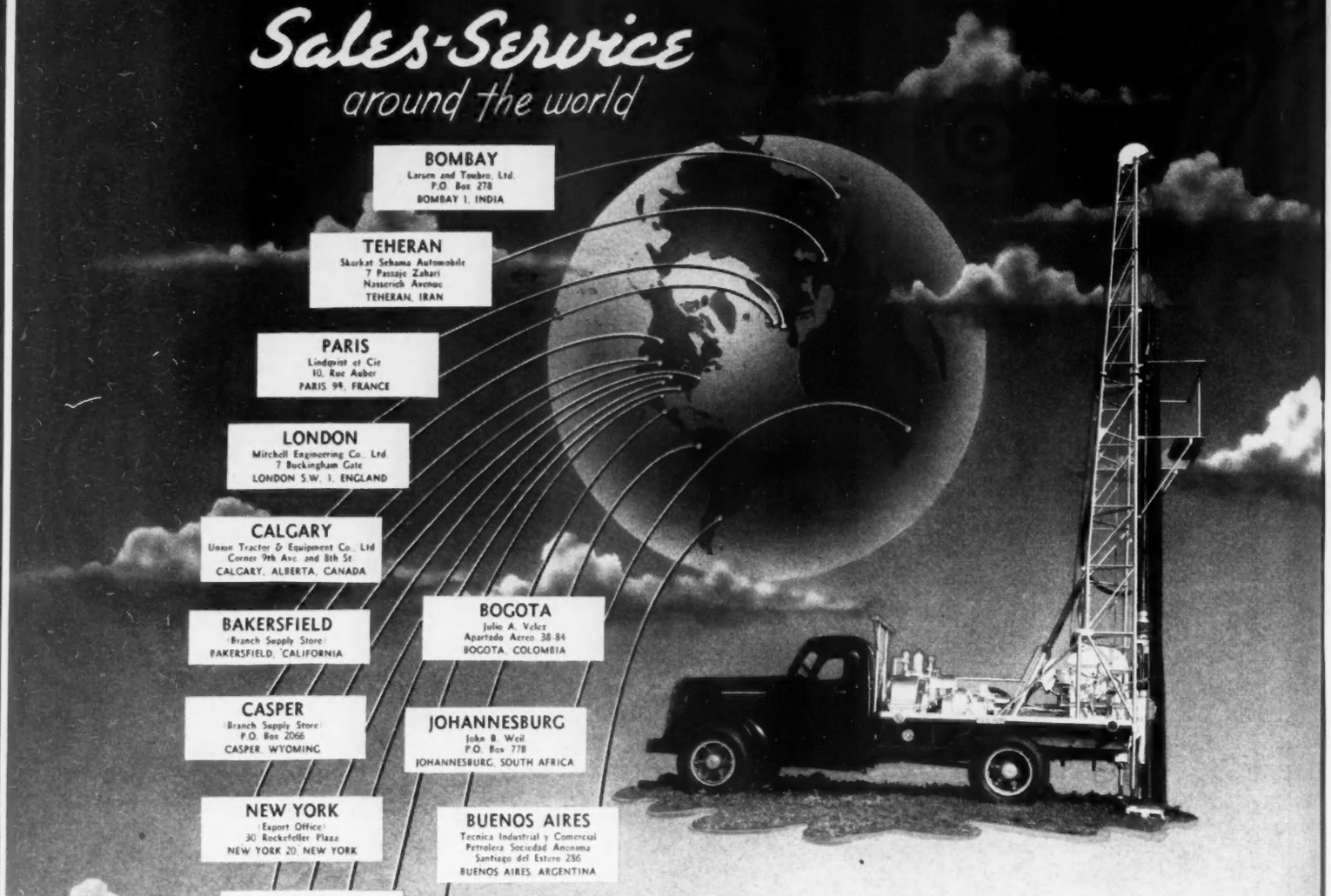
EXCLUSIVE DOMESTIC DISTRIBUTOR

JONES & LAUGHLIN SUPPLY CO., TULSA, OKLAHOMA

COLOMBIA


CARIBBEAN SEA
ARUBA
CURAÇAO
BONAIRE
GUAJIRA
GULF OF VENEZUELA
Riohacha
Sta. Marta
Dibulla
Barranquilla
ATLANTICO
Cartagena
Fundación
Valledupar
Caracas
Carmen
EL DIFICIL
MAGDALENA
Jagua
Lake Maracaibo
Covenas
Magangué
RIO DE ORO
La Gloria
TIBU
Mérida
Panama
BOLIVAR
SINU
Turbo
PETROLEA
NORTE DE SANTANDER
Cúcuta
VENEZUELA
Pto. Ospina
Pto. Wilches
CANTAGALLO
LA SALINA
Barranca
Bucaramanga
GALAN
CASABE
LA CIRA
INFANTAS
COLORADO
Dabeiba
ANTIOQUIA
Pto. Berrío
SANTANDER
Socorro
Arauca
ARAUCA
Anza
Medellín
VELASQUEZ
Pto. Carreño
PACIFIC
CHOCO
Quibdó
La Dorada
Tunja
BOYACÁ
Manizales
Pereira
CUNDINAMARCA
VICHADA
OCEAN
Ibague
Bogotá
Villavicencio
Buenaventura
VALLE DEL CAUCA
Cali
Palmira
TOLIMA
Tuluá
META
Villavieja
Caloto
Neiva
CAUCA
HUILA
Popayán
Puerto Inírida
VAUPÉS
MARIÑO
La Cruz
Florencia
Pasto
Mocoa
CAQUETÁ
PUTUMAYO
To Esmeraldas
Quito
EQUATOR
ECUADOR
BRAZIL
AMAZONAS
PERU
Iquitos
Legend
OIL FIELDS
Refineries
Pipe Lines
Roads
Railroads
Airlines
Towns
Scale
0 25 50 100 Miles
0 25 50 100 Kilometers

Sales-Service around the world



BOMBAY
Larsen and Toubro, Ltd.
P.O. Box 278
BOMBAY 1, INDIA

TEHERAN
Skorkat Sehama Automobile
7 Passaje Zahari
Nasserich Avenue
TEHERAN, IRAN

PARIS
Lindqvist et Cie
10, Rue Auber
PARIS 9e, FRANCE

LONDON
Mitchell Engineering Co., Ltd
7 Buckingham Gate
LONDON S.W. 1, ENGLAND

CALGARY
Union Tractor & Equipment Co., Ltd
Corner 9th Ave. and 8th St.
CALGARY, ALBERTA, CANADA

BAKERSFIELD
(Branch Supply Store)
BAKERSFIELD, CALIFORNIA

BOGOTA
Julio A. Velez
Apartado Aereo 38-84
BOGOTA, COLOMBIA

CASPER
(Branch Supply Store)
P.O. Box 2066
CASPER, WYOMING

JOHANNESBURG
John B. Weil
P.O. Box 778
JOHANNESBURG, SOUTH AFRICA

NEW YORK
(Export Office)
30 Rockefeller Plaza
NEW YORK 20, NEW YORK

BUENOS AIRES
Tecnica Industrial y Comercial
Petrolera Sociedad Anonima
Santiago del Estero 286
BUENOS AIRES, ARGENTINA

ENID
(Offices and Main Plant)
P.O. Box 872
ENID, OKLAHOMA

MIDLAND
(Branch Plant and Supply Store)
P.O. Box 1566
MIDLAND, TEXAS

HATTIESBURG
(Branch Supply Store)
510 Bowie St.
HATTIESBURG, MISSISSIPPI

HOUSTON
Branch Plant and Supply Store)
P.O. Box 1638
HOUSTON 4, TEXAS

MEXICO
Chavez, S. A.
Avenida Morelos 37, Desp. 306
MEXICO, D. F. MEXICO

FOR YEARS FAILING portable exploration drilling equipment has been in world-wide use. Wherever there has been a prospect for oil, FAILING drills have been on the job. Now, FAILING service is being extended to meet all the demands of foreign operations. Agencies have been established at strategic and convenient points in Canada, Europe, India, South Africa and Argentina. The service of these representatives is available to you, both as consultants and suppliers.

FAILING equipment is the finest in the world for oil field exploration, core drilling, seismograph shot-holes, mineral exploration, or water well drilling. Mounted on trucks, trailers, or skids, FAILING drills have met every test of the industry. They have operated successfully and economically in the swamps and salt dome areas of Louisiana, in the alluvial regions of the Gulf coast, the caliche formations of Wyoming and New Mexico, the desert regions of India, the mountain areas of Turkey, the highly varied conditions in South America, the frozen wastes in northern Canada and Alaska, and the carboniferous strata of England. When you buy a FAILING drill, you are buying a proven product.

Geo. E. Failing Supply Co.

MANUFACTURERS · PORTABLE DRILLING EQUIPMENT

ENID, OKLAHOMA, U.S.A.

COLOMBIA

COLOMBIA'S oil production, with substantial increases in the output from the Casabe and Barco concessions, established a new all-time high in reaching a total of 25,882,100 barrels. This is 318,000 barrels more than the peak year of 1940, and is 3,820,186 barrels more than the 1946 figure. Actually the potential has probably advanced no more than two million barrels above 1946, but in that year it is estimated that more than a million barrels of production loss was suffered through shutdowns caused by labor difficulties. Colombia is finding it increasingly difficult to maintain production on an uninterrupted basis, since although no loss occurred in 1947 a substantial amount was lost early in 1948 through a strike which continued for more than two months.

The overall drilling program for the year showed a nice increase in total drilling, with 162 wells drilled in 1947 to compare with only 118 the previous year. The 1947 record included 18 wildcats of which two showed evidence of being potential gas producers. The 162 wells also represented an increase of nearly 33 percent in footage drilled.

The year was also marked by decision of operators to place two new concession on exploitation, one of which, the Cantagallo field, was connected into the Andian pipe line system late in the year. Shell Group's El Difícil concession will be tied into the same line on completion of a connecting line now under construction. The latter will probably add several thousand barrels daily to Colombia's production, but Cantagallo field has only two wells capable of sustained production at a rate of approximately 800 barrels daily.

Oil Production and Producing Wells in Colombia Fields

Department, Concession and Field	Operating Company	Year of Discovery	PRODUCING OIL WELLS END OF 1947			CRUDE OIL PRODUCTION (Barrels)			
			Flowing	Art. Lift	Total Producing	Daily at End of 1947	Year 1946	Year 1947	Cumulative Through 1947
ANTIÓQUIA									
Yondo Concession									
Casabe	Shell Group	1941	30	34	64	14,730	3,208,649	4,776,000	19,794,000
BOLÍVAR									
Cantagallo Concession									
Cantagallo	Socony-Vacuum	1942	2	....	2	800	Not prod.	24,000	167,000
Floresanto Concession									
Sinú	Socony-Vacuum & Tropical Oil Co. (surrendered)	1945	....	....	....	.....	.....	100	11,000
BOYACÁ									
Terán Guaguaquí (Freehold)									
Velásquez	Texas Pet. Co. fee	1946	....	....	....	.....	.....	35,000	35,000
MAGDALENA									
El Difícil Concession									
El Difícil	Shell Group	1943	....	....	....	.....	Not prod.	119,000	218,000
NORTE DE SANTANDER									
Barco Concessions									
Carbonera	Colombian Pet. Co.	1939	....	2	2	.....	Not prod.	12,000	144,000
La Petrólea (North)	Colombian Pet. Co.	1933	....	....	....	8,285	3,236,123	3,163,000	26,613,000
La Petrólea (South Dome)	Colombian Pet. Co.	1937	....	....	....	.....	.....	.....	42,000
Río de Oro	Colombian Pet. Co.	1937	....	....	....	.....	Not prod.	.....	66,000
Tibú	Colombian Pet. Co.	1940	....	....	....	13,596	2,893,105	4,575,000	9,965,000
SANTANDER									
De Mares Concession									
Colorado	Tropical Oil Co.	1930	3	1	4	2,756	63,300	107,000	176,000
Galán	Tropical Oil Co.	1945	....	2	2	1,000	31,645	30,000	95,000
Infantas	Tropical Oil Co.	1915	6	259	265	8,365	2,957,413	3,481,000	150,004,000
La Cira	Tropical Oil Co.	1926	10	638	648	25,855	9,671,679	9,551,000	223,092,000
Las Monas Concession									
La Salina	Socony-Vacuum	1926	....	....	....	.....	.....	9,000	75,000
Totals			51	936	987	75,387	22,061,914	25,882,100	430,497,000

Note: Production from El Difícil, Sinú and Velásquez for field use only.

Drilling in Colombia

Department and Field	WELLS COMPLETED IN 1946					WELLS COMPLETED IN 1947					WELLS DRILLING AND SHUT DOWN AT END OF 1947		
				Total					Total				
	Oil	Gas	Dry	Wells	Footage	Oil	Gas	Dry	Wells	Footage	Drilling	SD	Total
Antióquia													
Casabe	17	..	..	17	68,108	18	..	1	19	65,647	3	..	3
Wildcats	..	..	..	..	.....	..	..	6	6	40,571	..	..	..
Atlántico													
Wildcats	..	..	..	..	.....	..	..	2	2	11,974	..	..	..
Bolívar													
Cantagallo	1	1	1	3	16,626	..	..	1	1	7,441	..	..	..
Wildcats	..	..	2	2	9,175	..	1	2	3	24,383	2	..	2
Boyacá													
Velásquez	..	..	..	..	.....	1	..	1	2	15,190	4	..	1
Wildcats	1	..	..	1	8,455	..	..	..	..	.....	1	..	1
Caldas													
Wildcats	..	..	3	3	10,674	..	..	..	..	.....	..	..	..
Cundinamarca											1	..	1
Magdalena													
El Difícil	3	..	1	4	22,753	2	..	..	2	15,228	2	..	2
Wildcats	..	..	5	5	41,192	..	..	4	4	31	3	..	3
Meta													
Wildcats	..	..	4	4	13,889	..	..	3	3	17,913	2	..	2
Norte de Santander													
Tibú	12	..	1	13	74,441	20	..	2	22	148,434	6	2	8
Santander													
Colorado	5	..	..	5	21,075	..	..	2	2	6,902	1	..	1
Infantas	2	..	1	3	5,110	12	..	1	13	21,124	1	..	1
La Cira	43	..	3	46	124,880	79	..	2	81	217,200	3	1	4
La Salina	1	..	..	1	4,378	1	..	1	2	8,301	1	..	1
Wildcats	..	..	1	1	9,310	..	..	..	..	.....	..	..	..
Total	89	1	28	118	454,744	133	1	28	162	600,339	27	3	30

PETOL & TITAN TONGS

"Most Complete Line of Tongs in the World"

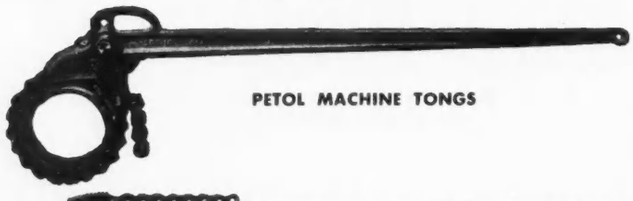
PETOL STABBING TONGS

PETOL HEAVY DUTY TUBING TONGS

TITAN PIPE TONGS

PETOL PIPE TONGS

TITAN CHAIN TONGS

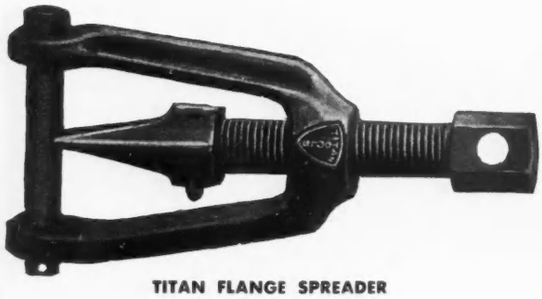


PETOL MACHINE TONGS

TITAN REVERSIBLE CHAIN TONGS

PETOL TUBING TONGS

PETOL FITTING TONGS



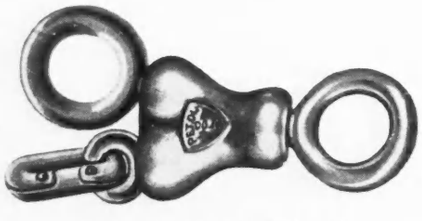
TITAN FLANGE SPREADER

PETOL BULL TONGS

28 Types
A TYPE FOR EVERY PURPOSE

290 Sizes
A SIZE FOR EVERY REQUIREMENT

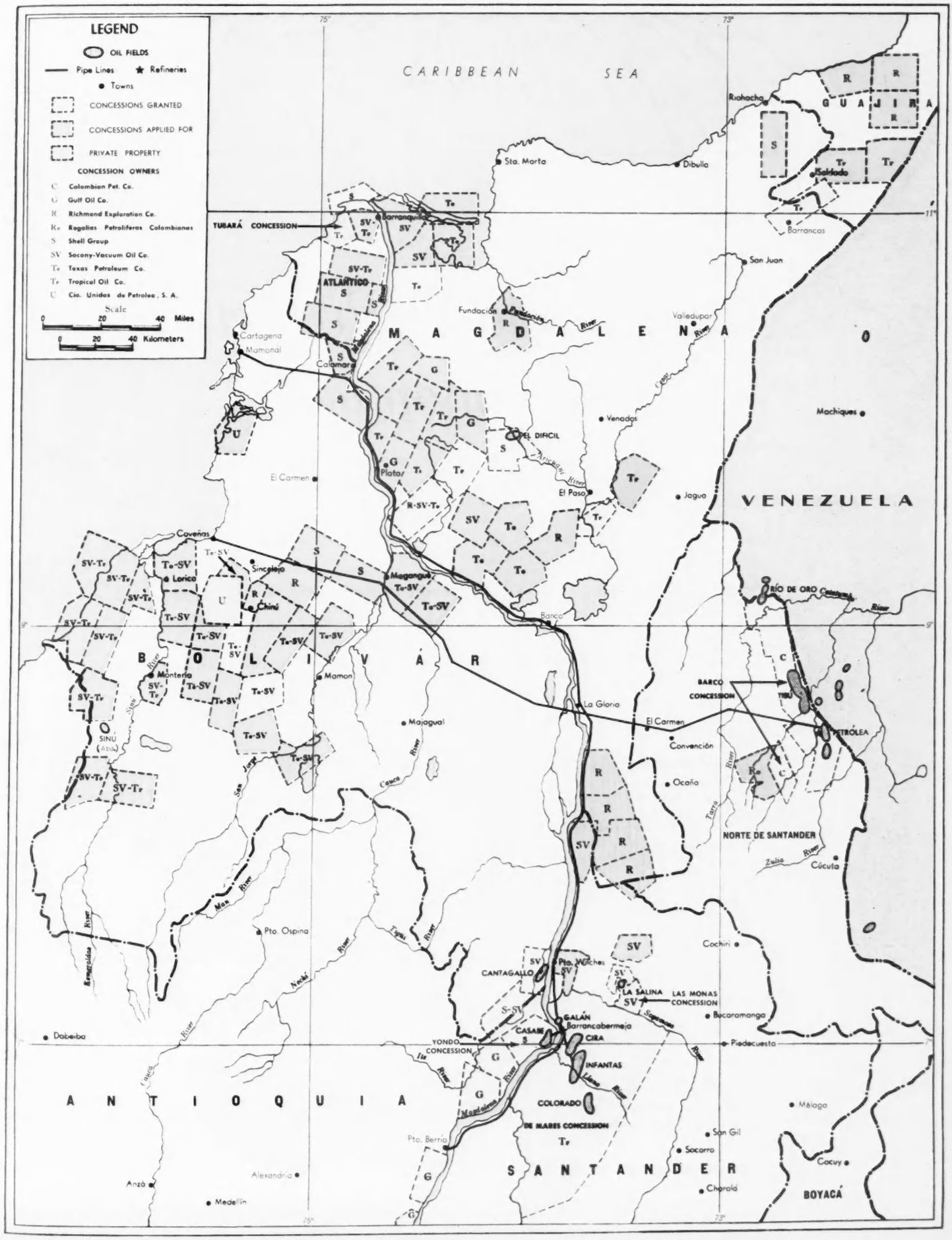
WRITE FOR CATALOG NO. 50

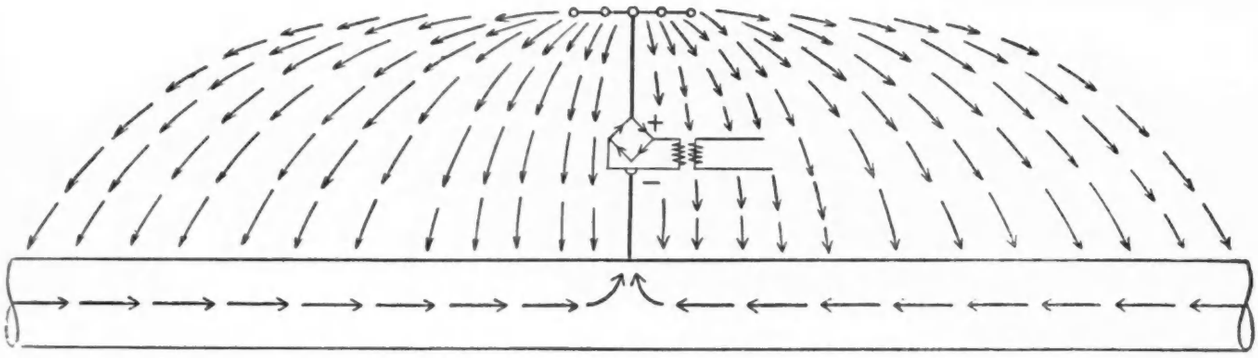


PETOL FORKED SPINNING LINE

GEARENCH MFG. COMPANY
HOUSTON, TEXAS, U.S.A.
EXPORT OFFICE: 74 TRINITY PLACE, NEW YORK, N. Y.

COLOMBIA—Northern Fields and Concessions





Why Cathodic Protection Is Economical

Experience has demonstrated that Cathodic Protection can only be used economically with protective coatings that provide non-deteriorating insulation.

Such insulation is furnished by the use of Barrett* Coal-tar Enamels. Their proved resistance to moisture absorption provides a continuous electrical insulation over long periods of time.

Stability of the electrical resistance of Barrett* Enamels requires a minimum of electrical energy and equipment to make Cathodic Protection economical, now and in the future. The service records of these efficient coatings are a dependable guide to engineers who are today building corrosion-proof pipelines.

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

FIELD SERVICE: The Barrett Pipeline Service Department and staff of Field Service men are equipped to provide both technical and on-the-job assistance in the use of Barrett Enamel.*

Barrett*

*Reg. U.S. Pat. Off.

COLOMBIA—Continued

During the year Socony-Vacuum and associates surrendered Floresanto concession where two small producers in the Sinú area were the only result of a series of 11 wells, one of which was taken to a depth of 10,876 feet during 1947. The company also surrendered its interest in the Tubará private lease, where two wells failed to find production. Another disappointment was registered by Tropical Oil Company's Cháviva wildcat in the Colombian Llanos region which prompted the company to suspend operations which have proved quite expensive since so much of the material has to be moved entirely by air. The year also marked the entry of the Sinclair-Richfield-Cities Service combine into Colombian operations by starting a wildcat at San Andres on a private property lease. The Texas Petroleum Company drilled two wells in its Velasquez area, a 1946 discovery, one of which was dry, but the other extended the area considerably.

A combination of conditions which include failure of wildcatting campaigns to produce a major field in the past several years, plus increasing expense and rapid deterioration of labor relations has prompted most of the companies to reduce their expenditures in the country during 1948. A contributing factor is also cited in the new petroleum legislation which had passed the first reading in the House of Representatives just before the close of the year. Most operators feel that under the new provisions the increased costs of exploration would materially reduce the attraction of taking new concessions.

Reports in Colombia are to the effect that a contract has been signed between D. D. Feldman and representatives of the Government and the Minister of Petroleum, needing approval of the Cabinet and the President to make it effective. Under the terms of the agreement, the Government would sell Feldman its royalty oil, which amounts to approximately

Wildcats Completed in Colombia in 1947

Department	Company, Well	Date Completed	Total Depth Feet	Results, Formation
Antióquia	Cía. Petróleo del Valle (Socony-Vac.), Cantagallo 11	7-10	7441	Abandoned, Cretaceous
	Caribbean, Gulf Oil Co.(Gulf) Sardinata 1	2-12	8250	Abandoned, L. Cretaceous
	2	6-21	7557	Abandoned, L. Cretaceous
	3	12- 7	5896	Abandoned, Basement
	Zahino 1	3-25	6737	Abandoned, L. Cretaceous
	2	7-28	4690	Abandoned, L. Cretaceous
Atlántico	Tubará Oil Company (Tropical-Socony), Tubará 1	10-18	8185	Abandoned, Cretaceous
	2	10-22	3789	Abandoned, Eocene
Bolivar	Cía. de Pet. de Pacífico (Tropical-Socony), La Risa 1	11-10	3573	Abandoned, Oligocene
	La Junta Pet Co. (Texas-Socony), Tablón 1	9-8	9934	Gas producer, Oligocene
	Sinú Oil Co. (Tropical-Socony), Floresanto 10	8- 5	10876	Abandoned, Oligocene
Magdalena	Cía. de Pet. La Estrella (Shell) Difícil 17	11-17	9528	Abandoned, Basement
	Cía. Pet. del Zulia (Tropical), El Paso 1	12- 5	2927	Abandoned, Basement
	Pet. Ariguaní S. A. (Trop.-Nat. Int.), Granada 1	7- 4	3870	Junked after gas fire
	Socorro Pet. Co. (Socony-Texas), Pinto 1	12-20	11206	Abandoned, Oligocene
Meta	Cía. Petrolera de Cauca (Tropical), Cháviva 1	7- 2	7824	Abandoned, Cretaceous
	Cía. de Pet. Shell de Colombia, San Martín 3	11- 1	5991	Junked, Oligocene
	4	9-23	4098	Abandoned, Miocene
Total	18 wells		122,372	

Pipe Lines of Colombia

COMPANY	Origin	Terminus	Lgth. Miles	Diam. Inches	Year Completed	Capacity Bbls. Daily	Status
Crude Oil Lines							
Andian National Corp. (Tropical)	Barranca-bermeja	Mamonál (Cartagena)	334	2-10	1926	57,000	In use
Cía. Colombiana de Petroleo El Condor (Shell Group)	Casabe	Barranca-bermeja	8	8	1945	20,000	In use
Cía. de Petroleo La Estrella de Colombia (Shell Group)	El Difícil	Plato	48	6	.....	.....	Building
South American Gulf Oil Corp. (Colombian Pet. Co.)	Petrólea (Barco)	Coveñas	261.6	12	1939	25,000	In use
Socóny-Vacuum Oil Co of Colombia	Cantagallo	Pt. Wilches	1.5	4	1947	1,000	In use
Products Lines							
Colombian Government	Pto. Berrío	Pt. Salgár	88	6	.....	.....	Planned
State of Antióquia	Pto. Berrío	Medellín	80	6	.....	.....	Planned
State of Caldas	Pto. Salgár	Manizales	56	6	.....	.....	Planned
Tropical Oil Co.	Barranca-bermeja	Pto. Berrío	56	6	1947	7,200	In use

Engineering and Geological Data on Colombia Fields

Department, Concession and Field	Proved Area (Acres)	Range of Gravity Oil (API)	Name	Kind	Age	DEPTH, (Feet) Minimum to Top of Pay	DEPTH, (Feet) Maximum to Bottom of Pay	Average Thickness of Pay (Feet)	Type of Structure
ANTIÓQUIA									
Yondo Concession									
Casabe	5,000	20.7	La Cira, Colorado	Sand	L. Mio.-Olig.	2100	3772	300	Faulted Anticline
BOLIVAR									
Cantagallo Concession									
Cantagallo	550	20	Esmeraldos, La Paz	Sand	Olig.-Eoc.	6006	6400	160	Faulted Anticline
Floresanto Concession									
Sinú	250	50	Pajuil	Sand	Miocene	650	2300	37.5	Faulted Anticline
BOYACÁ									
Terán-Guaguaqui (Freehold)									
Velásquez	400	25		Sand	Tertiary	6700	8455	85	Anticline
MAGDALENA									
El Difícil Concession									
El Difícil	2,500	44.6	El Difícil	Limestone	Olig.	5500	6100	28	Faulted Anticline
NORTE DE SANTANDER									
Barco Concession									
Carbonera	500	21	Cuerros, Barco	Sand	Eocene	.....	3359	10	Faulted Anticline
Petrólea	4,200	45	La Luna, Ostea, Zones 1, 2, 3, 4	Limestone	Cret.	99	1953	33	Anticline
Río de Oro	420	39	Catatumbo, Río de Oro, Uribante	Shale, Sand, Limestone	Cret.	.....	1865	21	Faulted Anticline
Tibú	8,000	31	Barco, Catatumbo, Uribante	Sand, Shale, Limestone	Tertiary, Cret.	4300	10876	100	Anticline
SANTANDER									
De Mares Concession									
Colorado	270	37.6	Colorado	Sand	Eocene	3400	4200	200	Faulted Anticline
Galan	426	19.5	Zone A		Oligocene	3900	4050	125	Faulted Anticline
Infantas	5,750	26.3	Zones A, B, C	Sand	Olig.-Eoc.	300	2600	390	Faulted Anticline
La Cira	12,265	24.5	Zones A, B, C.	Sand	Olig.-Eoc.	200	4300	382	Faulted Anticline
Las Monas Concession									
La Salina	400	21	Lisama	Sand	Eocene	1770	4378	20	Faulted Anticline

RED DEVIL

SLUSH PUMP VALVES

Simple, advanced design assures MAXIMUM SERVICE at LOW COST—no weak parts to cause breakdowns and expensive delays.

LOWER VALVE STEM GUIDE is forged integrally in the seat from one side only—assures free flow of fluid with minimum restriction. A patented feature.

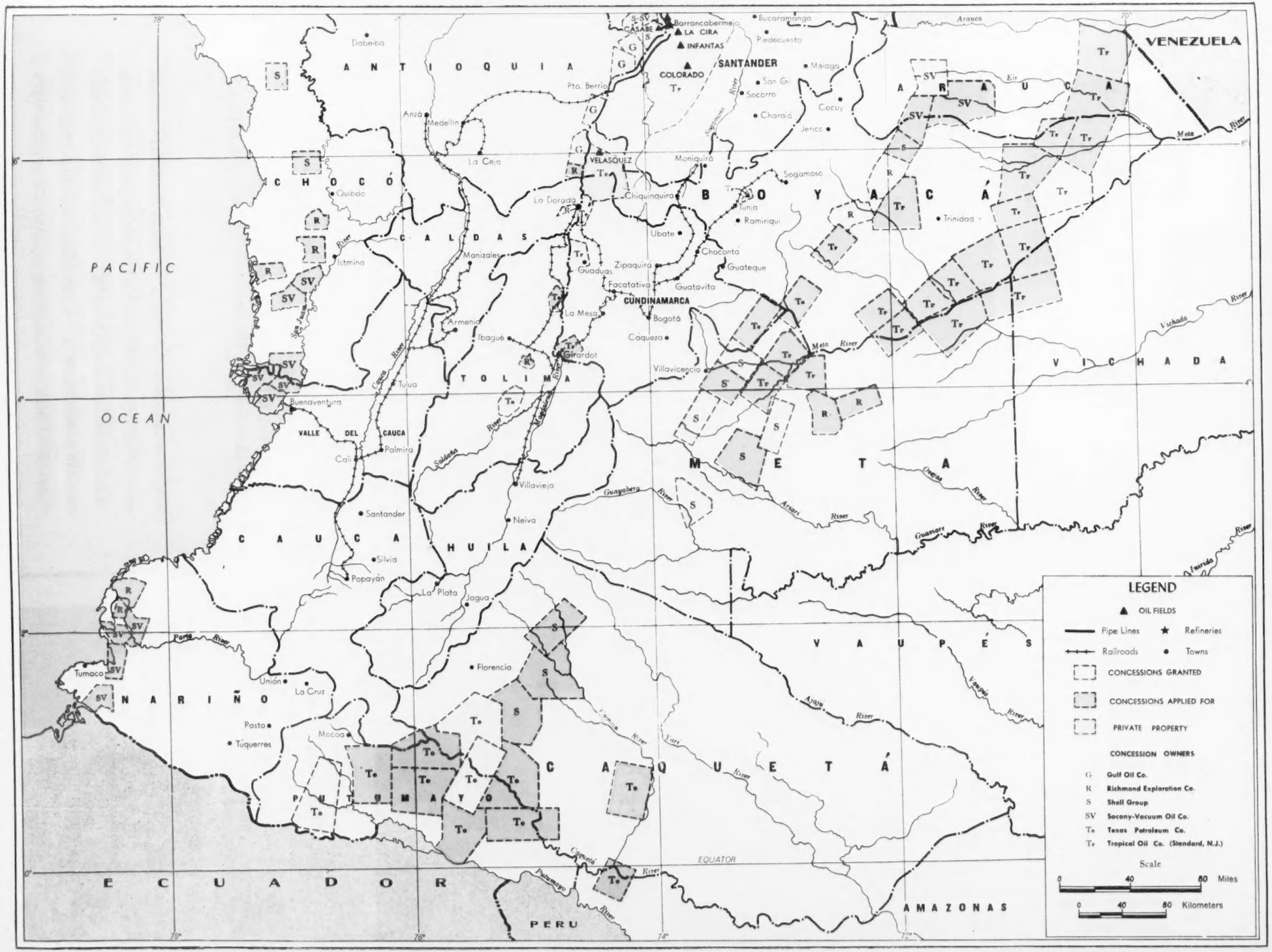
VALVE RUBBER INSERT IS REVERSIBLE—assures many days of additional service. Special DIA-TEX valve inserts available for oil, treated mud and high temperature service.

RED DEVIL VALVES AND SEATS are FORGED ALLOY STEEL—heat treated for toughness and hardness to withstand extreme abrasive wear.

PRACTICAL LOCKING DEVICE locks valve insert and plate to valve—no special tools needed to reverse or renew inserts.

RED DEVIL SLUSH PUMP VALVES ARE AVAILABLE FOR ANY SIZE OR MAKE OF PUMP. Write for literature or see Composite Catalog.

Oil Well Manufacturing
CORP.
6000 South Alameda Street
Los Angeles 1, California
Cable Address "OWMCO"



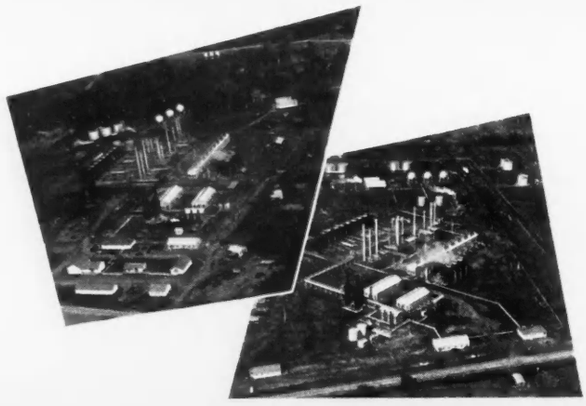
COLOMBIA—Southern Fields and Concessions

Two New

Gas Processing Plants

BUILT BY HUDSON

for The California Company



To these two plants at Cranfield, in Mississippi, and Lake St. John, in Louisiana, will pass many millions of barrels of crude oil, many billions of cubic feet of gas—the total recoverable reserves in each field. In such long-lived operations, quality of design and construction to insure continuing high plant recoveries, minimum down time, and minimum operating cost are of paramount importance. The two plants, complete with field piping systems, were designed and constructed by HUDSON in collaboration with The California Company, the unit operator for each field.

HUDSON
ENGINEERING CORPORATION
FAIRVIEW STATION HOUSTON, TEXAS

GAS COMPRESSOR STATIONS • CYCLING PLANTS • GAS DEHYDRATION PLANTS • NATURAL GASOLINE PLANTS FRACTIONATION UNITS • CRUDE TOPPING UNITS • PRESSURE MAINTENANCE PLANTS • HYDROGEN SULPHIDE REMOVAL PLANTS • ATMOSPHERIC AND VACUUM DISTILLATION UNITS

COLOMBIA—Continued

6800 barrels daily, at the market price plus 50 percent of the profits, conditions being that a 2000-barrel refinery be constructed in the Bogotá area and retail outlets be built.

Late in the year the supply problem was substantially eased by completion of a products line from Tropical Oil's Barrancabermeja refinery to Puerto Berrío, a rail terminal from which products can go directly to Bogotá. The Government plans connecting lines to Medellín and Manizales.

Late in 1947 there was a feeling among the representatives of the Government, that there should be created a Y.P.F. as an official oil operating agency. Such a fiscal agency would have as its immediate objective taking over and operating the De Mares Concession when Tropical Oil Company's concession expires on August 25, 1951. After a concerted effort to get such an entity in motion, backed by the National Petroleum Council, it is now thought that perhaps a plan may be worked out whereby the concession may be operated as a joint ownership venture by a company composed of the Government and Tropical Oil Company.

The 80-day strike early in 1948 on the De Mares properties presented a rather unfavorable angle from the viewpoint of any agency contemplating the operation of the properties. With the sharp decrease in field activity Tropical Oil Company had endeavored to reduce its staff of more than 3800 workers by laying off 107 men, but this precipitated the strike which was only called off when the 107 were re-instated by a decision of a three-man arbitration board.

Near the close of 1947 Tropical Oil Company spudded a well near Tunja, on the Bogotá Plateau, 100 miles north of the capital city. This is the first test to be drilled in the high plateau area and is scheduled to test the Cretaceous.

It is hoped that machinery may soon be set up for expediting the granting of concessions in Colombia. Some progress has been made during late 1946 and in 1947. The desire of companies to acquire additional acreage, and a tendency on the part of the government to facilitate this acquisition is seen in the number of concessions accepted for final examination which totaled 7,581,589 acres, to bring the total in that category to nearly 24 million acres. Of interest in the new applications was the trend toward acreage in the extreme south, the extreme northeast, and the west coast regions of Chocó and Nariño. The most recent operators in Colombia are the Compañías Unidas de Petróleo (Sinclair, Cities Service and Richfield) which has already started a wildcat in the San Andres area, Department of Bolivar, and Stanolind Oil and Gas Company.

Petroleum Concessions in Colombia

(Area in Acres. Data as of End of 1947)

	COMPANIES													
DEPARTMENT OR INTENDENCIA	Colombian Pet. Co.	Gulf Oil Corp.	Regalias	Richmond Pet. Co.	Richmond-Socony-Texas	Shell Group	Sinclair	Socony-Vacuum Oil Co.	Socony-Shell	Socony-Texas	Socony-Tropical	Texas Pet. Co.	Tropical Oil Co.	Total
Concessions in Exploitation:														
Antióquia	.....	.....	.....	.....	.....	118,139	.....	.....	.....	.....	.....	.....	.....	118,139
Antióquia-Bolívar	.....	.....	.....	.....	.....	.....	.....	52,360	.....	.....	.....	.....	.....	52,360
Norte de Santander	461,596	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	461,596
Santander	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,265,152	1,265,152
Total in Exploitation	461,596	.....	.....	.....	.....	118,139	.....	52,360	.....	.....	.....	.....	1,265,152	1,897,247
Concessions in Exploitation:														
Antióquia	.....	456,090	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	456,090
Antióquia-Bolívar	.....	.....	.....	.....	.....	.....	.....	.....	123,303	.....	.....	.....	.....	123,303
Antióquia-Caldas	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Arauca	.....	.....	.....	.....	.....	.....	.....	244,955	.....	.....	.....	.....	.....	244,955
Bolívar	.....	.....	.....	.....	.....	.....	.....	.....	.....	123,503	.....	.....	.....	123,503
Boyacá-Vichada	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	492,023	492,023
Caldas	.....	.....	.....	22,726	.....	.....	.....	.....	.....	.....	.....	.....	.....	22,726
Caquetá	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	493,805	.....	493,805
Caquetá-Putumayo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	494,195	.....	494,195
Cundinamarca	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	86,660	.....	86,660
Magdalena	.....	.....	.....	.....	123,550	120,011	.....	.....	.....	.....	.....	123,407	174,927	541,895
Magdalena-Guajira	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	123,535	123,535
Meta	.....	.....	.....	.....	.....	739,028	.....	.....	.....	.....	.....	.....	.....	739,028
Putumayo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	494,190	.....	494,190
Santander	.....	.....	.....	.....	.....	.....	.....	30,910	.....	.....	.....	.....	.....	30,910
Tolima	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	123,540	.....	123,540
Total in Exploration	.....	456,090	.....	22,726	123,550	859,039	.....	275,865	123,303	123,503	.....	1,815,797	790,485	4,590,358
Concession Applications Accepted:*														
Arauca	.....	.....	.....	.....	.....	.....	.....	737,474	.....	.....	.....	.....	984,590	1,722,064
Atlántico	.....	.....	.....	.....	.....	203,134	.....	.....	.....	.....	177,433	.....	.....	380,567
Atlántico-Bolívar	.....	.....	.....	.....	.....	121,931	.....	.....	.....	.....	.....	.....	.....	121,931
Atlántico-Magdalena	.....	.....	.....	.....	.....	61,486	.....	.....	.....	.....	.....	.....	.....	61,486
Bolívar	.....	.....	.....	154,786	.....	366,516	120,125	.....	.....	1,682,351	929,019	.....	.....	3,252,797
Boyacá	.....	.....	.....	439,962	.....	150,343	.....	.....	.....	.....	.....	247,098	3,458,508	4,295,911
Boyacá-Vichada	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	972,082	972,082
Caquetá	.....	.....	.....	.....	.....	1,109,980	.....	.....	.....	.....	.....	370,650	.....	1,480,630
Caquetá-Amazonas	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	247,098	.....	247,098
Caquetá-Putumayo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	945,061	.....	945,061
Chocó	.....	.....	.....	329,085	.....	244,671	.....	369,073	.....	.....	.....	.....	.....	942,829
Chocó-Valle	.....	.....	.....	.....	.....	.....	.....	243,369	.....	.....	.....	.....	.....	243,369
Cundinamarca	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	240,821	240,821
Cundinamarca-Boyacá-Meta	.....	.....	.....	.....	.....	234,678	.....	.....	.....	.....	.....	247,100	.....	481,778
Guajira	.....	.....	.....	362,540	.....	.....	.....	.....	.....	.....	.....	.....	241,115	603,655
Magdalena	.....	268,553	.....	738,478	.....	.....	.....	146,292	.....	.....	.....	609,952	621,766	2,385,041
Magdalena-Guajira	.....	.....	.....	.....	.....	123,513	.....	.....	.....	.....	.....	.....	.....	123,513
Meta	.....	.....	.....	444,770	.....	604,286	.....	.....	.....	.....	.....	.....	1,228,290	2,277,346
Nariño	.....	.....	.....	123,155	.....	.....	.....	485,480	.....	.....	.....	.....	.....	608,635
Norte de Santander	.....	.....	123,465	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	123,465
Putumayo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,909,728	.....	1,909,728
Santander	.....	.....	.....	.....	.....	.....	.....	367,475	.....	.....	.....	.....	.....	367,475
Tolima	.....	..	.....	16,644	.....	.....	.....	.....	.....	.....	.....	61,632	.....	78,296
Valle	.....	..	.....	.....	.....	.....	.....	122,448	.....	.....	.....	.....	.....	122,448
Total Applications	.....	268,553	123,465	2,609,440	.....	3,220,538	120,125	2,471,611	.....	1,682,351	1,106,452	4,638,319	7,747,172	23,988,026
Grand Total	**461,596**	**724,643**	**123,465**	**2,632,166**	**123,550**	**4,197,716**	**120,125**	**2,799,836**	**123,303**	**1,805,854**	**1,106,452**	**6,454,116**	**9,802,809**	**30,475,631**

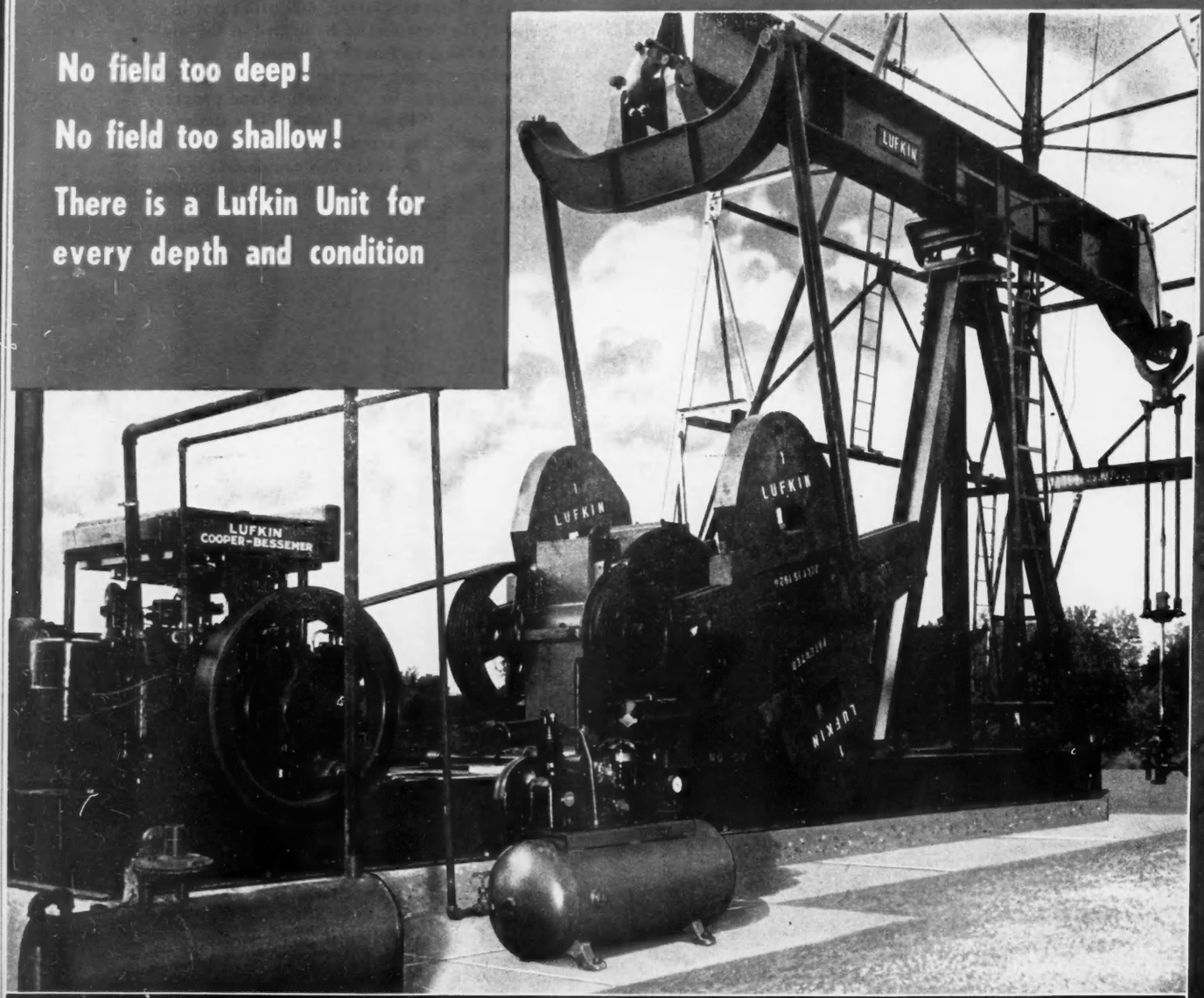
* Applications on these concessions have been accepted by the Colombian government, but not yet contracted.

LUFKIN

No field too deep!

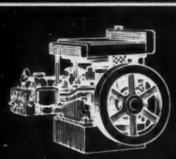
No field too shallow!

There is a Lufkin Unit for every depth and condition

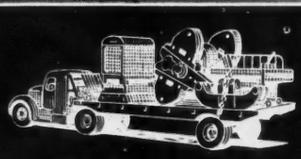


Conventional Lufkin Unit with Lufkin Cooper-Bessemer horizontal gas engine drive — a completely Lufkin engineered installation

LUFKIN
PUMPING UNITS



LUFKIN-COOPER-BESSEMER
ENGINES



LUFKIN OIL FIELD AND INDUSTRIAL
TRUCK TRAILERS

INDUSTRIAL SPEED REDUCERS
AND INCREASERS

LUFKIN FOUNDRY AND

ECUADOR

WITH very little change in producing or drilling volume during 1947, aside from a continuation of the decline in production which has continued for several years, the outstanding developments in Ecuador were in its exploratory program. The chances of further large-scale prospecting along the coastal area west of the Andes have been materially lessened by the complete failure of the International's extensive wildcatting program. At the same time interest has been aroused by the determined efforts of the Shell Group to prospect a 25 million acre concession in the remote "Oriente" region on east side of the mountains. No new fields have been discovered in Ecuador since 1937, and it is thought that any substantial deposits found in the country will have to be in the great jungle area on the eastern slope of the mountains.

Production from the fields on Santa Elena Peninsula, on which all of Ecuador's productive fields are concentrated, totaled 2,282,410 barrels during the year just completed, a decline of only 84,440 barrels from 1946, and the increase in output from Carolina-Santa Paula, Concepción, and El Tigre areas indicates that the decline may be halted still further in 1948.

The Ancón fields of Anglo-Ecuadorian Oilfields, Ltd., are still the largest producers, contributing more than three fifths of the total from the nation, but they showed a decline of nearly 150,000 barrels during 1947, considerably more than the amount of increase from the smaller fields.

With slightly increased availability of materials it has been possible to step up drilling activity in this area, and the company is now running four rotary rigs continuously, drilling about four wells annually with each rig. As a British company, it is having considerable difficulty in obtaining sufficient exchange for purchase of special materials in view of the comparatively small return in petroleum products.

The same problem is confronted by Ecuador Oilfields, Ltd., which is running three rigs in the Santa Elena region. The production problem of the region is complicated by the preponderance of pumping wells. Most of the drilling on the smaller concessions is done with spudders and cable tools, developing the shallow Socorro and Atlanta sands of the upper Eocene.

Some four-fifths of the crude produced is a low cold-test oil from the shallower depths from about 600 to 1000 feet, while the remaining high cold test crude comes mostly from the range between 3000 and 4500 feet. Producing sections are thick, ranging from 200 feet to more than 1000 feet, but they are not consistent and are badly faulted. Formations are quite hard and abrasive, and rotary rigs get very little footage from rock bits.

The year 1947 saw a rapid expansion in the Shell Group's operations in the Oriente. It has been necessary to establish an extensive air base for the operation of a fleet of nine planes and all operations are completely airborne. Rigs, personnel and supplies have to be flown from the air base to airstrips carved from the jungle near wildcat locations after being moved by rail and truck to the operating base. Three rigs have been moved in to various parts of the huge concession, after first flying in tractors and bulldozers to build airstrips on which to land heavy freighters.

Two dry holes have already been drilled, in the Arajuno and Macuma areas, in southeastern Ecuador, and one well is drilling in an extremely remote area near the confluence of the Napo and Tiputini rivers, near the extreme eastern border of the country. With discovery of commercial oil, a

REFINERIES OF ECUADOR

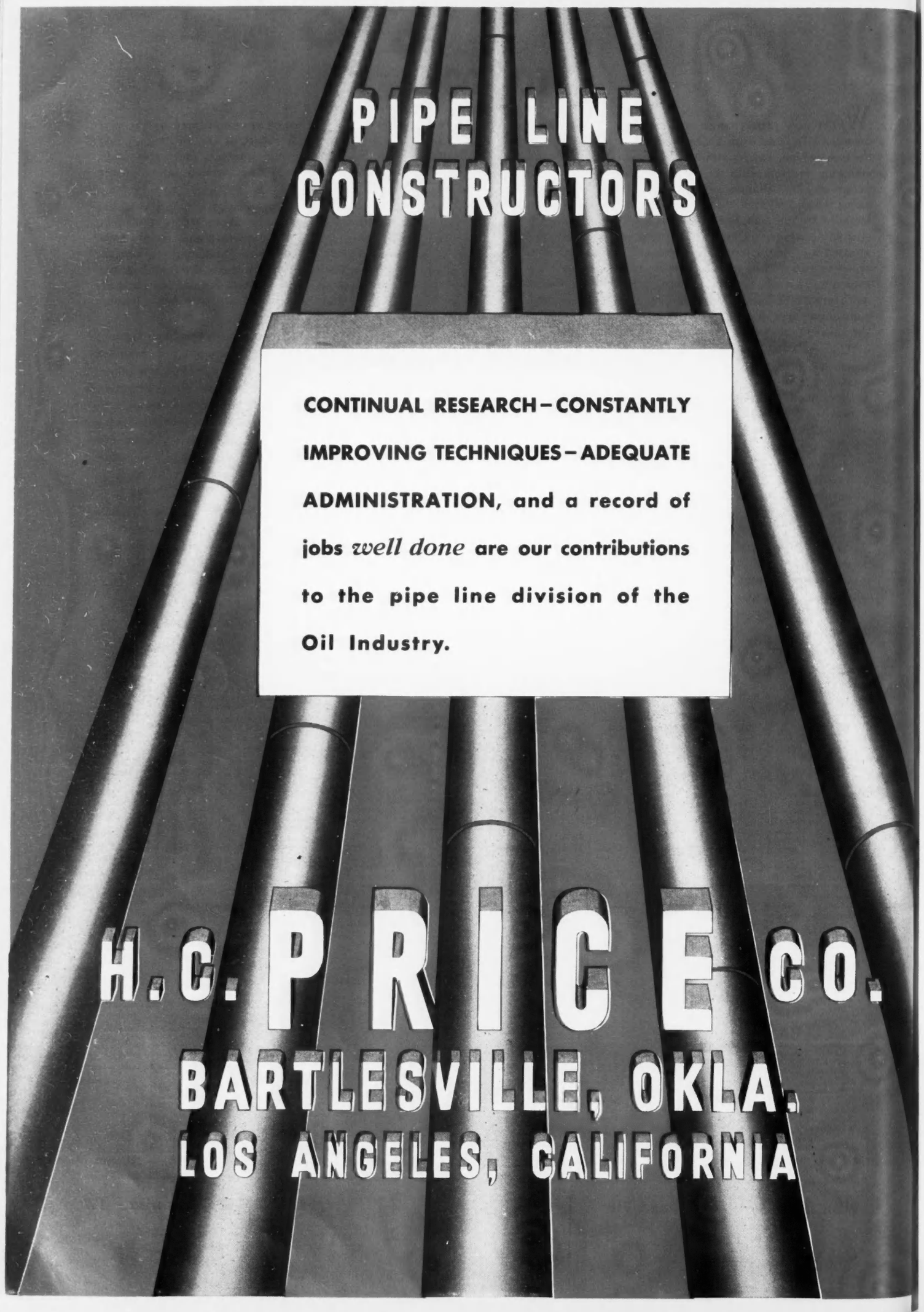
Company Headquarters Address	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery	Operating Status
Anglo-Ecuadorian Oilfields, Ltd., 146 Dashwood House, Old Broad St., E.C., 2, London	La Libertad, (100 mi. w. Guayaquil)	2700	None	Skimming (One lb. oil cut)	Operating
Ecuador Oilfields, Ltd., River Plate House, Finsbury Circus, E. C. 2, London; Apto. 865, Guayaquil, Ecuador	Cautivo (Guayas, 90 mi. from Guayaquil)	600	None	Skimming	Operating

CRUDE OIL PIPE LINES OF ECUADOR

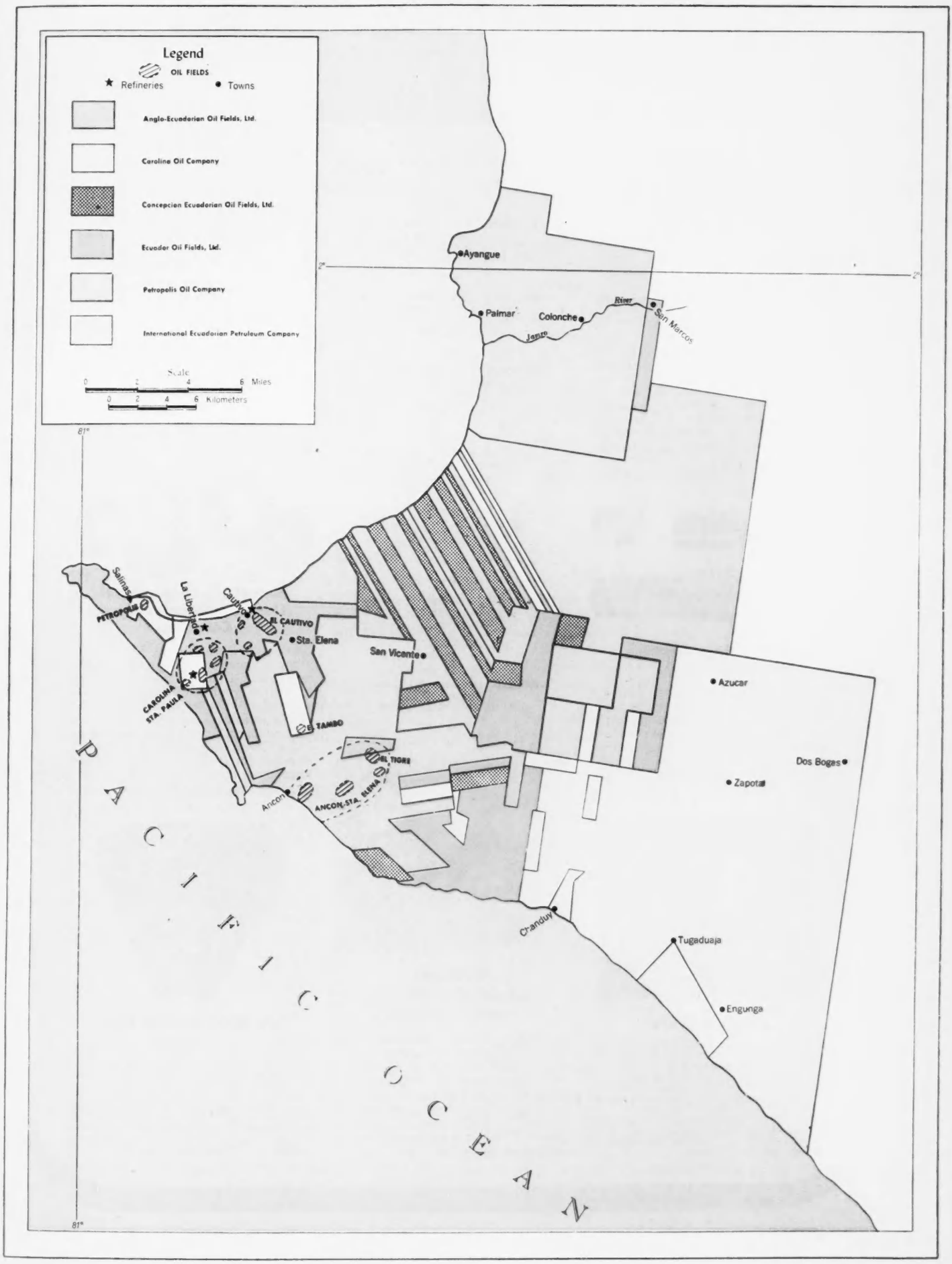
COMPANY	Origin	Terminus	Length (Miles)	Diameter (In.)	No. of Pump Stations	Capacity of Line (Bbls. Daily)	Year Completed	Status
Anglo-Ecuadorian Oilfields, Ltd.	Ancón	La Libertad	8	6	1	12,960	1925	Operating
Carclina Oil Co.	Santa Paula	Carolina	3	4	2	2400		Operating
Ecuador Oilfields, Ltd. (British Controlled Oilfields, Ltd.)	Tigre	Cautivo	11	4	1	2500	1940	Operating
Ecuador Oilfields, Ltd.	Cautivo	Anglo tank-farm and submarine line	2	8-10	None	30,000	1940	Operating
Ecuador Oilfields, Ltd.	Cautivo	Anglo-tank-farm snd submarine line	2	10	...	....		Planned
Petrópolis Oil Co.	Petrópolis Salinas	Libertad	8	4	1	3600	1940	Operating

Oil Production and Producing Wells in Ecuador

PROVINCE AND FIELD	Operating Company	Year of Discovery	PRODUCING OIL WELLS END OF 1947			CRUDE OIL PRODUCTION (Barrels)			
			Flowing	Art. Lift	Total Producing	Daily at End of 1947	Year 1946	Year 1947	Cumulative Through 1947
GUAYAS									
Ancón	Anglo-Ecuadorian Oilfields, Ltd.	1921	45	548	593	4,256	1,673,810	1,532,300	34,888,233
El Tambo	International Ecuadorian Pet. Co.	1931		5	5	3	939	1,012	15,052
Carclina-Sta. Paula	Carclina Oil Company			35	35	309	70,068	100,864	1,044,456
Petrópolis	Petrópolis Oil Company	1937	2	6	8	202	77,498	74,686	688,346
Concepción	Concepción Ecuadorian Oilfields, Ltd.	1931	4	13	17	242	76,096	85,585	741,977
El Tigre	Ecuador Oilfields, Ltd.	1928	14	6	20	1,346	468,439	487,963	3,815,112
El Cautivo	Ecuador Oilfields, Ltd.	1920		40	40				
Totals			65	653	718	6,358	2,366,850	2,282,410	41,193,176


PIPE LINE
CONSTRUCTORS
CONTINUAL RESEARCH – CONSTANTLY IMPROVING TECHNIQUES – ADEQUATE ADMINISTRATION, and a record of jobs *well done* are our contributions to the pipe line division of the Oil Industry.
H.C. PRICE CO.
BARTLESVILLE, OKLA.
LOS ANGELES, CALIFORNIA

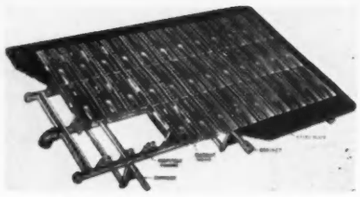
ECUADOR—Santa Elena Fields and Concessions



HENRY H. PARIS DISTRIBUTOR Inc.

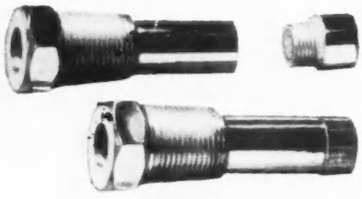
Manufacturer's Agent - Oil Well and Refinery Supplies

P. O. BOX 932 HOUSTON, 1125 ROTHWELL ST. TEXAS



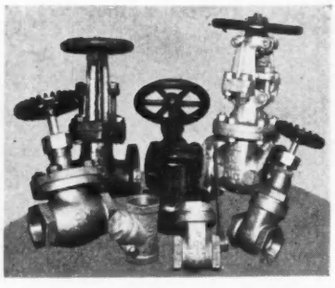
Volcano Superior Gas Burners

These burners derive their higher efficiency and longer life from such features as: All-steel construction; Burner heads with double barrel shank and double mixer are equivalent to two ordinary burner heads; Slight H-shape of head assures more perfect combustion by proper circulation of secondary air; series of heads on triple manifold covers approximately entire firebox area. For superior efficiency, specify Volcano Superior Gas Burners.



OSECO High Pressure Fusible Plugs

Unique design permits replacement of inserts instead of the entire plug. OSECO "Silver Top" plugs are made in all standard sizes of best quality bronze, under A.S.M.E. specifications, for 300 and 350 lb. oil field boilers. They can also be furnished in Monel or Stainless Steel.



O.I.C. VALVES

OIC valves give you all of these benefits: Longer uninterrupted service; Lower maintenance and replacement costs; Minimum over-all cost. They've been doing it for users everywhere, as impressive performance records attest. OIC valves are backed by more than 57 years of engineering skill, manufacturing integrity and outstanding valve performance. In OIC's you get all the benefits that it is possible for valves to render.

Agent and Distributor for the following Nationally known Manufacturers

★

W. C. NORRIS MANUFACTURER, INC.
Tulsa, Oklahoma
Quality Pumping Equipment, Swage Nipples, Bull Plugs, Welding Fittings, etc.

★

WHEELING MACHINE PRODUCTS CO.
Wheeling, West Virginia
XL Steel Pipe Couplings for OIL COUNTRY TUBULAR PRODUCTS. Gas-Water-Steam.

★

THE OHIO INJECTOR COMPANY
Wadsworth, Ohio
OIC VALVES, Bronze, Iron and Steel, for all purposes. "Oh! I See Lower Costs with OIC."

★

HARRISBURG STEEL CORPORATION
Harrisburg, Pennsylvania
Forged Steel Flanges and Seamless Casing Couplings.

★

VOLCANO BURNER COMPANY
Houston, Texas
Volcano Superior and Gulf States All Steel Gas Burners for OIL COUNTRY BOILERS.

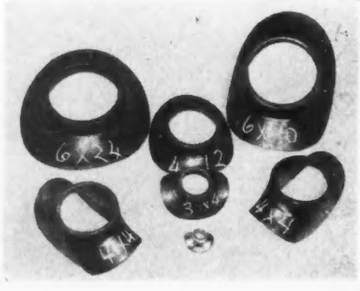
★

OIL STATES EQUIPMENT COMPANY
Houston, Texas
OSECO Silvertop Fusible Plugs with renewable inserts for all types OIL COUNTRY BOILERS.

★

DRESSER MANUFACTURING DIV.
Bradford, Pa.
Seamless Welding Fittings

★



FLEETLINE
Forged Steel Welding
PIPE SADDLES

Fleetline saddles fit the contour of the pipe . . . have correct wall thickness. They weld neatly into place with much less time and welding rod. Fleetline Saddles are made from welding grade, seamless steel of proper chemical and physical analyses. They do a better, safer, more permanent job at less cost.

Norris Quality Products

W. C. Norris swaged nipples, bull plugs, stuffing boxes, sucker rods, polished rods, welding caps and other equipment are backed by 63 years manufacturing experience, assuring the user highest quality for the utmost in efficient performance and service at no increase in cost.

Harrisburg Forged Steel Flanges - Seamless Pipe Couplings

Harrisburg Drop-Forged Steel Pipe Flanges meet every test of strength and safety. Their unvarying uniformity merits your consideration wherever quality is essential. Made to ASA standards.

Harrisburg Forged Seamless Steel Pipe Couplings are uniform in strength and quality. Threads will not strip under most severe strain. Manufactured to API specifications.

90 DEG. DRESSER ELLS

Made by an exclusive process from seamless steel pressure tubing, meeting ASTM A-234 standards, Dresser Ells are cold formed to assure optimum physical properties of the metal. Center-to-face dimensions held to one and one-half times the nominal size. Minimum wall not less than thickness of specified pipe. Straight tangent on both ends means, 1) Weld removed from plane of greatest stress, 2) Straight bead welding permitted, 3) Pipe alignment simplified.

ECUADOR—Continued

pipe line to the Pacific coast would have to climb to passes in the Andes, the lowest practical one of which is at an altitude of 14,000 feet.

The Government issued a decree on July 15, 1947, raising the royalty on crude oil from 35 to 40 centavos per American gallon of crude, and on natural gasoline from Sucres 1.04 to Sucres 1.20 per gallon. The reason given was that world prices had risen and that this increase should be passed on by the producers and marketers. Actually the royalty now amounts to about 10 percent on crude oil and 8 percent on natural gasoline. In the same decree the Government provided that companies could not raise prices on products sold within the country. Most companies thought the royalty increase not unreasonable, but thought they should have been allowed to raise domestic prices, which they say are now below cost. Present consumption of gasoline in Ecuador is about 1,700,000 gallons monthly.

Engineering and Geological Data on Ecuador Oil Fields

PROVINCE AND FIELD	Proved Area (Acres)	Gravity of Oil (API)	PRODUCING FORMATION			Depth of Wells (Ft.)		Avg. Thickness of Pay (Ft.)	Type Structure
			Name	Kind	Age	Minimum to Top of Pay	Maximum Total Depth of Wells		
Guayas									
Ancón-Sta. Elena	18,000	37–41	Socorro	Sandstone	Eocene	1200	4000	600	Faulted anticline
			Atlanta			3000	6000	2500	
El Cautivo	....	39–44	Socorro	Sand	Eocene	750	1000	250	Steeply dipping erratic blocks
Carolina, Sta. Paula	....	28–31	Socorro	Sand	Eocene	632	836	200	Steeply dipping erratic blocks
Concepción	....	38	Atlanta	Sand	Eocene	1100	3570	....	Structural strat. trap
El Tambo	....	....	Socorro	Sand	Eocene	....	4000	....	Structural strat. trap
El Tigre	200	39	Atlanta	Sand	Eocene	2900	4306	400	Structural strat. trap
Petrópolis	100	35	.....	Shattered Chert	Eocene	....	2000	....	Steeply dipping erratic blocks

PARAGUAY

UNION Oil Company of California, the only oil operator presently engaged in a search for oil in Paraguay, has now drilled two dry holes in the Chaco region, and was selecting location for a third wildcat well to be started about the middle of 1948.

The company's La Paz D-1, its second well, had drilled to below 6000 feet by the end of 1947, and was abandoned early in 1948, the progress of the wildcat having been slowed down somewhat by the revolutions during which the country was torn by internal strife for a period of several months. However, in the latter part of the year operations had returned to normal with Government forces having regained full control in the nation. River traffic, upon which the company depends for much of its transportation of heavy equipment and supplies, was delayed at times by the fighting, but no loss or injury to company personnel was sustained. The company now has a cargo plane which is used for transportation of a good part of the supplies and equipment to and from the field camps. The plane is based at Asuncion.

In January, 1947, Union Oil had abandoned its Santa Rosa 1, just southeast of the town of Santa Rosa in the western part of the country at a depth of 7579 feet where it is believed to have been in the Lower Devonian series. The La Paz D-1 was situated about 45 miles southeast of the Santa Rosa 1, and had been drilling in the Devonian for some time before reaching the depth of 7252 feet at which it was abandoned in March, 1948. No showings of oil or gas have been reported in either of the wildcats drilled to date, but some information for correlation and stratigraphy is being assembled.

Location for a third test, tentatively known as Pirizal 1, has been made in the southern Chaco about 75 miles south and 9 miles west of the town of Mariscal Estigarribia, where it will be very near the Argentine border.

A tremendous exploration problem was faced by Union in its operations in Paraguay, since no drilling had been done to give an idea of the section to be expected, and no outcrops existed in the area to help in geological reconnaissance. A contract was made giving the company the exploration rights for 10 years on the whole of the Chaco region comprising some 56 million acres, or approximately half of the nation, with a clause providing for selection of acreage up to 2000 hectares around any discovery of oil. A Western Geophysical Company seismic crew started work early in 1945 and the first wildcat location was made early in 1946. Meanwhile a second crew was added to speed up the geophysical investigation of the area, and at the end of 1947 still another crew had been activated, so that three parties are now working continuously in the heavily wooded, remote area, searching for drilling sites.

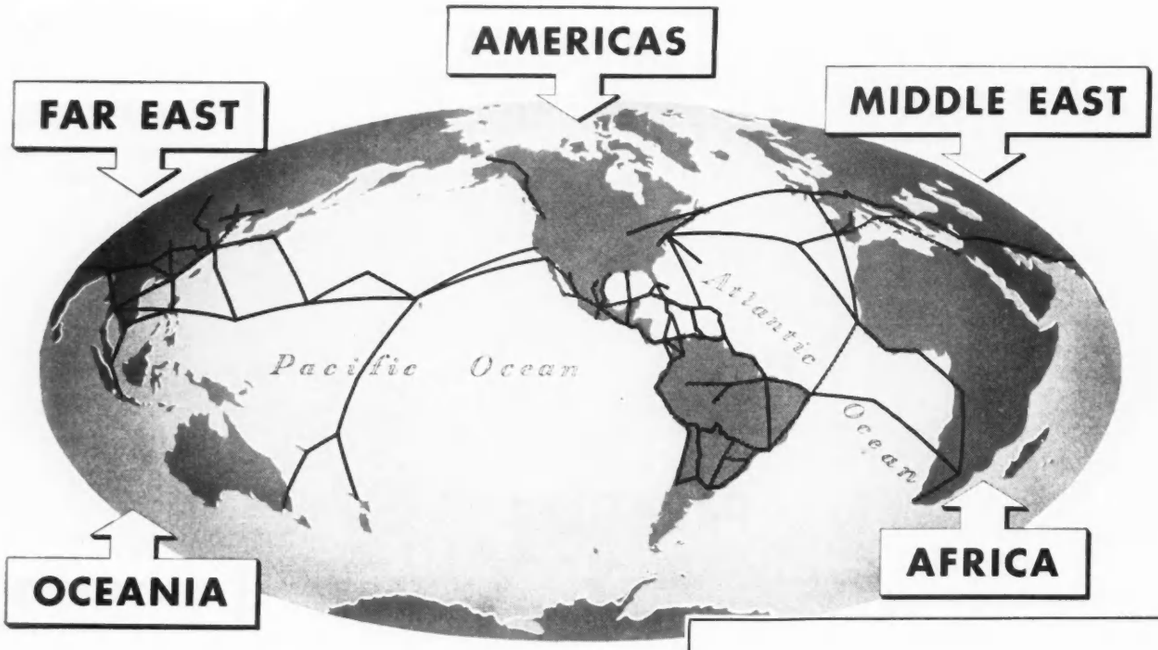
In the light of stratigraphic information secured in drilling the first two deep tests, and with the three seismograph crews surveying the southwestern part of the contracted area, it is thought that some definite conclusions may be reached before the expiration of the initial exploratory period.

In operating drilling equipment and supplying the needs of personnel in this area, material comes in by ocean vessels to the ports of either Buenos Aires or Montevideo where it is transshipped to river boats and barges for movement up the Rio Paraná and Rio Paraguay to Puerto Casado where it moves by rail to Kilometer 160, thence by truck to the base camps, from which it is moved to the various operational camps.

By decree of the Paraguay Government early in the year, Union Oil Company was required to form a separate corporation for operations in that country. The new company, called Union Oil Paraguay, was incorporated with a capitalization of $10 million. It is authorized to engage in all phases of the oil industry in Paraguay, including production, refining and marketing. The country is now dependent entirely on outside sources for its petroleum requiremets, having no production and no refineries.

Every major oil field in the world is close at hand by Clipper

Only Pan American World Airways offers speedy, one-carrier service for men and equipment to all 6 Continents



TIME MEANS MONEY. To save you *both* time and money Pan American World Airways is at your service to fly men and equipment to fields on any of the earth's 6 continents. This saving can be made with confidence due to a tremendous background of experience that goes along on every Pan American flight.

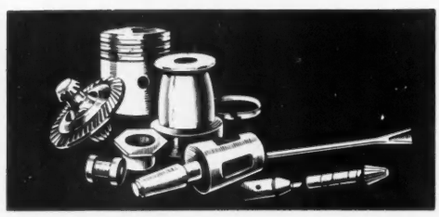
Pan American has completed more miles of overseas flight than any other airline in the world ... over half-a-billion miles of regularly scheduled *civilian* flying.

Bulk shipments. Essential drilling and refinery equipment . . . shipments of every size and description . . . can now be flown by regular or charter flights of Clipper Cargo to fields any place in the world.

For information on all services and flights call or write your nearest Pan American office.

PAN AMERICAN WORLD AIRWAYS

7 Reasons why it pays to ship by CLIPPER CARGO



1. You get essential parts to drilling fields and refineries in the shortest possible time.

2. A single airway bill will take Clipper Cargo directly to destination without costly re-shipment delays.

3. Trained PAA shipping consultants are at your service to discuss details of international air shipments.

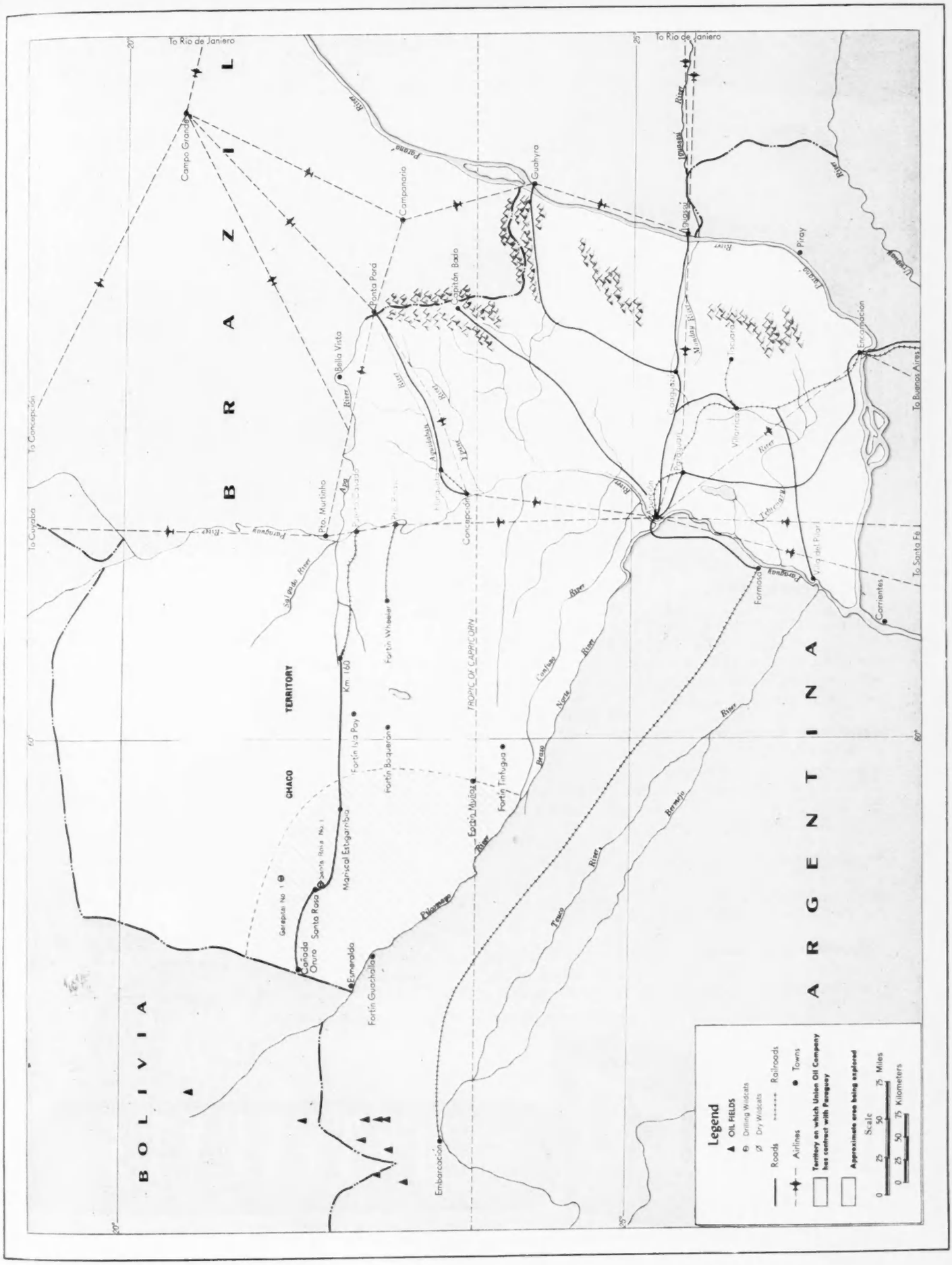
4. Fast shipment of tools and replacement parts reduces loss due to drilling, production and refinery shutdowns . . . daily service over most routes.

5. You can get low cost all-risk insurance on Clipper Cargo . . . C.O.D. service to many countries.

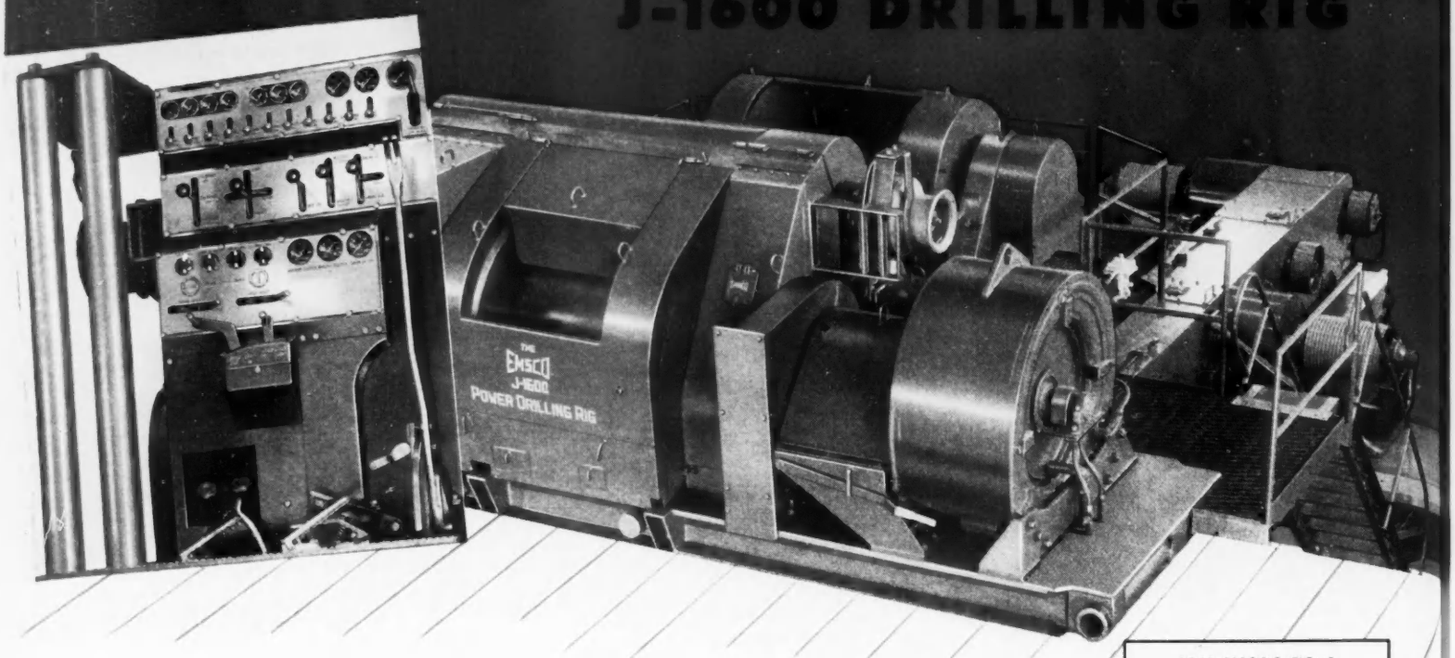
6. Pan American operates special all-cargo planes.

7. You're dealing with the most experienced air carrier in the business. Pan American handles more international air cargo than all other U. S. airlines combined!

PARAGUAY


To Rio de Janiero
To Rio de Janiero
To Concepción
To Cuyaba
To Buenos Aires
To Santa Fe
BRAZIL
BOLIVIA
ARGENTINA
CHACO
TERRITORY
Campo Grande
Campanario
Guahyra
Capitán Bado
Punta Pora
Bella Vista
Pto. Murtinho
Concepción
Fortín Whelan
Fortín Ivá Poy
Fortín Boquerón
Fortín Muñoz
Fortín Tinfunque
Fortín Guachalla
Mariscal Estigarribia
Santa Rosa No. 1
Cañada Oruro
Esmeralda
Embarcación
Km. 160
Formosa
Corrientes
Encarnación
Villarrica
Pilcomayo River
Paraguay River
Paraná River
Tebicuary River
Confuso River
Negro River
Bermejo River
Tarco River
Pilaya River
Pirayi River
Ipaguazú River
Monday Road
Tropic of Capricorn
Legend
OIL FIELDS
Drilling Wildcats
Dry Wildcats
Roads
Railroads
Airlines
Towns
Territory on which Union Oil Company has contract with Paraguay
Approximate area being explored
Scale
Miles
Kilometers

Announcing THE NEW EMSCO J-1600 DRILLING RIG



BRIEF SPECIFICATIONS ON THE J-1600	
Horsepower Input	1600
Hoisting Speeds	6
Rotary Speeds	3
Drum Reverse Speeds	2
Main Drum 41" long by 28¾" dia.	

The Most Versatile "Big-Rig" in the Market

And Here's Why...

DESIGN SIMPLICITY. The design simplicity of the new J-1600 provides the ultimate in flexibility. The rig may be powered by two, three or four engines of a wide variety of sizes and makes. Separate countershaft packages available for driving one or two slush pumps at different speeds simultaneously.

INSTALLATION ADAPTABILITY. Exclusive "stair-step" design permits placing of engines, pumps, compounding and selective speed transmission at any desired level. Rig may be flat-set, medium-set, or full stair-step to meet varying height substructures. Long chain drives are eliminated. "Packaged" design facilitates transportation and reduces rigging-up time.

FINGERTIP EFFICIENCY. Complete, air-operated controls, centralized at the driller's position, speed up drilling operations. Variable pressure valves control direct air-operated friction clutches and gear tooth clutches in selective speed transmission.

UNSURPASSED DEPENDABILITY. All Emsco rigs are designed and engineered to provide long, trouble-free service. Power is transmitted by means of fully enclosed chain drives. All chain drives and bearings are pressure oil-lubricated from built-in oil pumps. This insures positive lubrication and minimizes rig service time.

OPERATING FLEXIBILITY. The J-1600 may be equipped with any or all of these accessories – *Automatic Drilling Control:* end of lineshaft designed to accommodate any type of feed-off device. *Sand Reel:* equipped with air clutch and air actuated brakes. *Wash Down Pump:* drive provided from selective speed transmission. *Generators and Compressor:* compounding transmission provides drives for Thyrite generators and air compressor.

MAXIMUM PORTABILITY. Complete rig breaks down into three basic packages–drawworks, selective speed transmission and compounding transmission. All units meet road clearance requirements without removing chain guards. Fawick power-take-off clutches on compounding transmission facilitate removal of engines and eliminate flexible couplings.

The basic drawworks is designed to be driven by internal combustion engines, electric motors or steam engine.

EMSCO ALONE OFFERS ALL THESE OUTSTANDING FEATURES

EMSCO

CONTINENTAL

SERVING THE OIL AND GAS INDUSTRIES

EMSCO DERRICK & EQUIPMENT COMPANY • Houston, Texas • LOS ANGELES, CALIFORNIA • Dallas, Texas

Distributor: **THE CONTINENTAL SUPPLY COMPANY**

General Offices: DALLAS, TEXAS • EXPORT DIVISION: *30 Rockefeller Plaza,* NEW YORK, N. Y. • *Representatives:* ARGENTINA • BOLIVIA • BRAZIL • CHILE COLOMBIA • ENGLAND • JAVA • MEXICO • PERU • TRINIDAD • VENEZUELA

PERU

SOME increases in availability of materials, permitting an increase of nearly 17 percent in drilling volume has helped Peru to arrest a production decline which had continued for the past four years without interruption. In 1947 production amounted to 12,763,809 barrels, an increase of 295,700 barrels over 1946. At the close of the year Peru's fields were producing at a combined rate of 35,921 barrels daily which, if maintained, would account for an additional increase in 1948.

For the past several years Peru had been concerned about its steadily dropping production in the light of rising consumption which within a short time is likely to cause the nation to become an importer rather than a net exporter of crude oil and products, a valuable source of foreign exchange. Practically all of the productive fields are concentrated within a relatively small area on the Pacific coast in northern Peru, and regulations were such that it was not possible for companies to obtain concessions for exploration. Petroleum legislation has been proposed for the past several years which would tend to liberalize the granting of concessions, and a number of companies entered the country for preliminary investigation in anticipation of passage of the new laws. However, the internal political situation has unfortunately been such that no action was taken and the end of 1947 saw the nation still without a new law and the prospective new operators moving personnel to other areas.

Early in 1948 the Administration established by decree the "Empresa Petrolera Fiscal" a government oil company which is designed to promote the search for, and development of new reserve, and is likewise empowered to enter into agreements with outside operators in somewhat the same manner as the granting of concessions. It was hoped that this would suffice as a stop-gap measure to increase available outside capital and technology in opening up new oil sources within the country.

The two general regions considered most attractive for exploration are the so-called "Montaña," the area east of the Andes, and the coastal area just south of the presently producing fields which includes the Sechura Desert. In each case operations would be somewhat difficult, with the latter the most easily accessible through its proximity to Internaional Petroleum Company's operations at Talara. A contract has been made between International and Government representatives covering the Sechura area, but it requires ratification by Congress, and no action was taken on it last year.

The Montaña region is considered by many to hold the most favorable oil territory in the country, but it comprises the heavy forest region of the Upper Amazon system and operations would be extremely expensive if undertaken on a large scale. The Compañía de Petroleo Galso Azul's field at Agua Caliente in Huánuco Province is in this region, and although its seven productive wells have a potential of more than 3000 barrels daily, the field is producing no more than 400 barrels a day which is processed in a small refinery and retailed up and down the Amazon system as far as Manáos, Brazil. It is estimated that a pipe line across the Andes to tidewater would cost from $25 million to $30 million and oil to supply the line would have to be producible at rates of 75,000 barrels a day upward before it would be economically feasible. All of the heavy drilling equipment used by Ganso Azul had to be moved up the Amazon from the Atlantic side of the continent. Many of the company's supplies still come in by that route, consuming about six to eight weeks in the journey from the mouth of the Amazon to Agua Caliente on the Ucayali River. An area of more than 1000 acres has been proved, but drilling has been suspended since such a limited market outlet exists.

International Petroleum Company is the largest single operator in Peru, with a daily average production of nearly 29,000 barrels at the end of 1947. With the efficient operating methods in use in the La Brea-Parinas area, it is thought that

Oil Production and Producing Wells in Peru

DEPARTMENT AND FIELD	Operating Company	Year of Discovery	Producing Oil Wells End of 1947			CRUDE OIL PRODUCTION (Barrels)			
			Flowing	Art. Lift	Total Producing	Daily at End of 1947	Year 1946	Year 1947	Cumulative Through 1947
Huánuco									
Agua Caliente	Compañía de Petróleo Ganso Azul	1932	7	....	7	356	89,236	118,001	403,402
Piura									
La Brea-Pariñas	International Pet. Co.	1875	190	2,226	2,416*	28,770	10,022,533	10,205,658	288,479,258
Lobitos	Cia. Petrolera Lobitos	1901	26	204	230	2,137	778,696	778,651	31,635,433
Los Organos	Establicimientos Petroleros Fiscales	1943	..	11	11	316	105,438	105,661	385,069
Restin-El Alto	Cia. Petrolera Lobitos	1904	25	635	660	4,311	1,455,353	1,543,325	33,459,508
Tumbes									
Zorritos	Establicimientos Petroleros Fiscales	1865	..	45	45	31	16,870	12,513	3,541,480†
Total			248	3121	3,369	35,921	12,468,126	12,763,809	357,904,150

* Includes 26 gas wells. † Includes 3,214,468 bbls. prod. by the old Sociedad Faustino G. Piaggio, 1884 to 1938; and 327,012 bbls. prod. by E.P.F., 1939 to 1947.

Drilling in Peru

DEPARTMENT AND FIELD	WELLS COMPLETED IN 1946					WELLS COMPLETED IN 1947					WELLS DRILLING AND SHUT DOWN AT END OF 1947		
	Oil	Gas	Dry	Total Wells	Total Footage	Oil	Gas	Dry	Total Wells	Total Footage	Drlg.	SD	Total
Huánuco													
Agua Caliente	2	..	..	2	1,937	..	..	..	..	.....	..	..	..
Loreto													
Wildcats	..	..	..	..	.....	..	..	1	1	2,600	1	..	1
Piura													
La Brea-Pariñas	55	3	36	94	325,468	70	..	32	102	345,237	15	..	15
Lobitos	5	..	1	6	21,689	8	..	0	8	15,439	2	1	3
Los Organos	2	..	..	2	6,025	5	..	1	6	7,807	2	..	2
Restin-El Alto	30	..	..	30	65,517	32	..	5	37	76,070	13	2	15
Puno													
Pirin	..	..	..	..	.....	..	..	2	2	3,590	0	0	0
Total	94	3	37	134	420,636	115	..	41	156	450,743	33	3	36

HOW MUCH DOES IT COST YOU TO PRODUCE SAND WITH YOUR OIL?

It costs money to replace the valves, chokes, and other equipment cut out by sand. Furthermore, production troubles are increased in many ways.

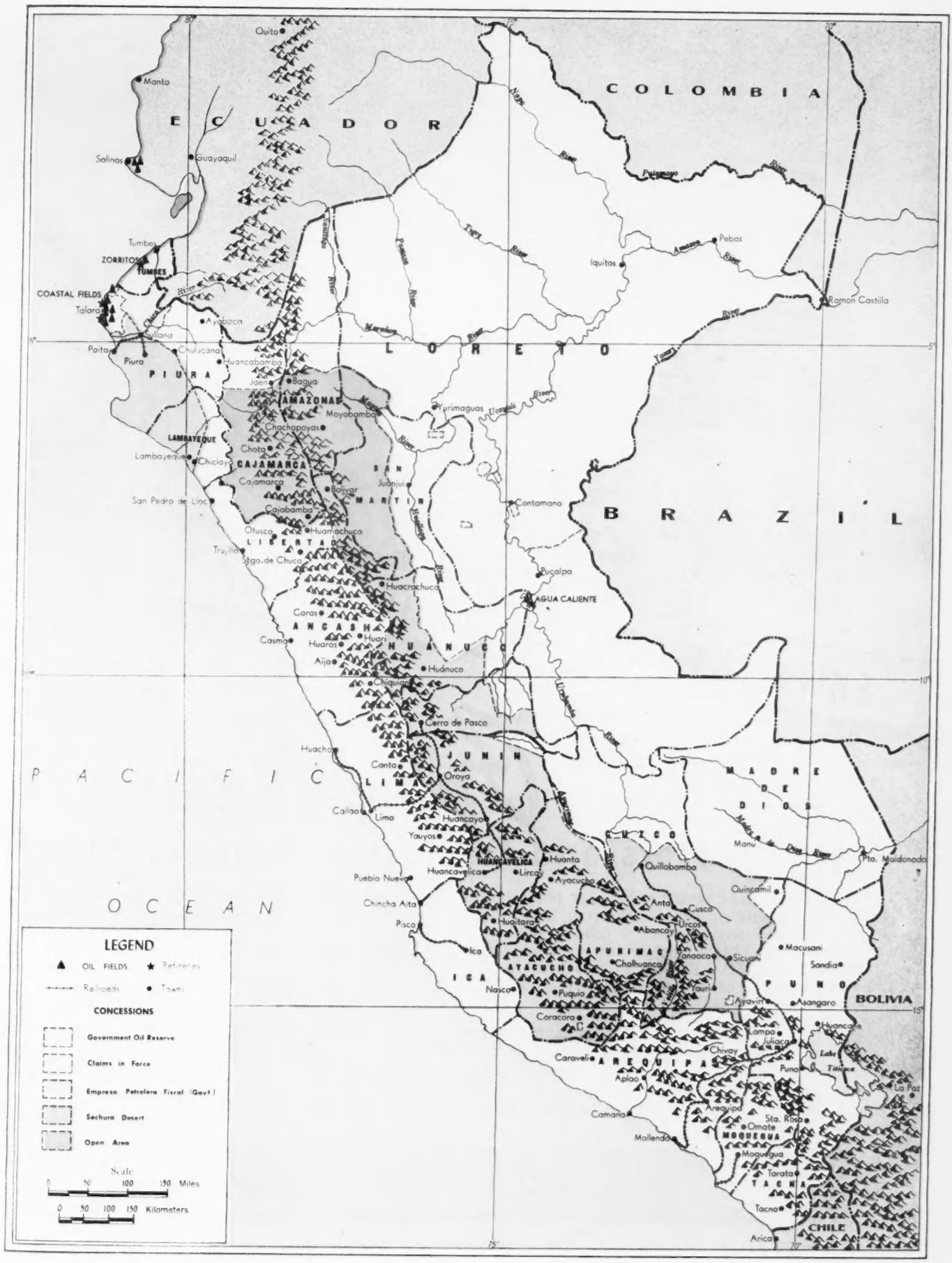
Install STANCLIFF SCREEN in your wells and produce oil free from sand.

HOWARD SMITH COMPANY

Phone: F-6363 — 1201 SAWYER STREET • HOUSTON, TEXAS — P. O. Box 688

EXPORT REPRESENTATIVE: ACME WELL SUPPLY CO., 19 RECTOR ST., NEW YORK, N. Y.

PERU—Concessions



. . . SHIPMENT O.K. ON ARRIVAL STOP . . .

MEANS *Good News*
to Exporters and Domestic Shippers Alike!

The scientific protection of your products to point of final destination is our business! Whether it's the careful blocking of heavy trucks (top, left), or structural stress bracing for a 40,000 lb. vertical pump (top, right); shock-proof boxes for delicate gravity meters (left, center), interior support for big bull wheels (right, center), or a 32-foot long, 20-inch square crate for a deep well dump bailer—*Tulsa Crating* ENGINEERS EACH JOB TO FIT ITS PARTICULAR NEED!

Regardless of the destination of your products—you can rely on our PRECISION-ENGINEERED packaging for protection against—

WEATHER — CLIMATE — ELEMENTS
PILFERAGE — VANDALISM
MECHANICAL DAMAGE
FAULTY PACKAGING
OVERCRATING

Complete Counselling Service on Export and Domestic Shipping Regulations

TULSA CRATING COMPANY

DOMESTIC "From Warehouse to Destination" EXPORT

AIR . . . RAIL . . . TRUCK

519 S. Rockford **TULSA, OKLAHOMA** **Phone 3-3492**

PERU—Continued

this rate can be maintained through the next few years, but the great need is for new sources since many of these areas have been in operation for more than 50 years. The complex nature of the reservoirs in this area make each well virtually a wildcat, adding materially to the expense of development. The fields of the La Brea-Pariñas area, with a total of 2416 producing wells, have only 190 flowing producers, and include 2200 wells on the pump. Of these pumping wells 1000, or nearly half, are making less than a barrel a day each.

Development in all areas should be stepped up materially in 1948 and 1949 since both International, and the Lobitos Company which operates the area just north of Talara, have started changing over to rotary drilling equipment. The Lobitos company placed its first rotary in operation during 1947 and now has increased to three rotaries in addition to its 13 cable tool rigs. International has 16 rotaries.

Wildcatting is being carried on in the Montaña region by the Peruvian Government's oil agency, and by an independent local firm known as Compañía Peruana de Petróleo El Oriente, which completed a 2600-foot dry hole in the Ucayali River near the town of Contamana, and was starting a second test early in 1948. The Government operations are at Santa Clara in the same general area, and in the Pirin area of the extreme southeast part of Peru near Lake Titicaca, where a little oil had been found a number of years ago and a total of 300,000 barrels was produced from one well, but 12 wells drilled since that time have failed to find production.

Peru's refining capacity is only slightly below present production, the largest plant being International's 29,000-barrel refinery at Talara. The Government's Villar refinery can process 1200 barrels daily, and operates largely on its own small production at Los Organos plus crude produced by the Lobitos company, 10 percent of which is royalty oil delivered to the refinery.

Inasmuch as all fields in the Talara-Lobitos area are along the coast of the Pacific, there are no extensive trunk pipe line systems. The lines are more in the nature of a gathering system delivering crude to the refinery and terminal storage.

Many observers feel that Peru's only chance to keep itself from becoming an importer of products within a comparatively short time lies in making much more acreage available for exploration by outside capital. It still remains to be proved whether such capital will be attracted by contracts for leases entered into with Empresa Petrolera Fiscal, although the administration of the Government, in issuing its Supreme Decree creating the agency with such powers, cited statutory basis for its action. There is little doubt that some contracts will be made, but it is questionable whether outside companies would enter on a large scale with the attendant risks of the great amount of money which must be invested in a large-scale venture.

At the close of 1947 there were only 710,734 acres under concession to private entities, the greater portion of which was held by International, Ganso Azul and Lobitos firms. Of the total, only 85,571 acres is held under concessions which might be termed exploratory in nature. This area is held in several small tracts by the Compañía Peruana de Petróleo "El Oriente," which drilled one shallow wildcat in 1947 and is starting a second now. The remainder of the territory in Peru is under the direction of the Government which has not been empowered by law, except through the recent decree, to grant concessions.

Refineries of Peru

COMPANY	Location of Plant	Crude Charging Capacity, (Bbls. Daily)	Cracking Capacity, (Bbls. Daily)	Type of Refinery	Operating Status
Cía. Ganso Azul	Agua Caliente	1,000	None	Skimming	Operating
Compañía Petrolera Lobitos	Lobitos	100	None	Skimming	Operating
International Pet. Co.	Talara	29,000	2,000	Complete	Operating
Refinería Villar; Establecimientos Petrolerea Fiscales	Zorritos	1,200	None	Skimming	Operating
Total	4 Plants	31,300	2,000		

Engineering and Geological Data on Peru Fields

Department and Field	Proved Area (Acres)	Range of Gravity Oil (A.P.I.)	Name	Kind	Age	DEPTH (FT.) Minimum to Top of Pay	DEPTH (FT.) Maximum to Bottom of Pay	Average Thickness of Pay (Feet)	Type of Structure
Huánuco									
Agua Caliente	1,000	44.4	Agua Caliente Sandstone and Ash bed	Sand	L. Cretaceous	1000	1300	100	Dome
Piura									
La Brea-Pariñas	20,000	37.2	Verdun-Talara Pariñas-Salina-Negritos	Sand	Eocene	60	6000	170	Faulted & Folded
Lobitos	5,000	36.5	Terebratula-L. Caverno	Sand	U. Eocene	142	6500	....	Block Faulting
Los Organos	250	44.	Talara and Lomitos conglomerates	Sand	U. Eocene	1800	2400	30	Monocline & Block Faulted
Restín-El Alto	10,000	36.5	Terebratula-L. Caverno	Sand	U. Eocene	100	6600	....	Block Faulting
Tumbes									
Zorritos	1,000	38.	L. Zorritos	Sand	Miocene	1200	1800	20	Monocline & Block Faulted

URUGUAY

URUGUAY has no producing sources of oil within its boundaries, and although a considerable amount of geological investigation has been carried out in the nation from time to time, reports have been to the effect that these have failed to show any conclusive indications of the presence of oil in exploitable quantities. More recent studies have led to the decision that the most likely areas for oil accumulation are in the Paraná Basin, Artigas, Salto, Río Negro and other areas, and wildcatting is planned in the area of Merino lagoon. Recently there was a report that oil had been discovered in a wildcat near the town of Coronilla in the department of Rocha, but later reports have indicated that this may not be the case. In the absence of outstanding features for surface geology, it is thought that a program of wildcat drilling in addition to geophysical work would allow much more conclusive estimates as to the potentialities of the nation.

The importation and refining of crude oil in Uruguay is under the direction of the "Administración Nacionál Combustible Alcohol y Portland," which operates an 8000-barrel refinery in Montevideo. All mineral resources belong to the State and are administered by the Inspección General de Minas. The ANCAP was created in 1931, with a monopoly on refining of petroleum in addition to alcohol and cement. It is planned to expand the refining facilities to approximately 12,500 barrels daily and thus supply all of the domestic requirements of the country. Through work now in progress, this might be completed by the end of 1948.

PARKERSBURG MACHINE Co.
PARMACO
PARKERSBURG, W. VA., U.S.A.

The House of Courteous Service

Ask Your Favorite Supply House to Furnish You with

PARMACO PRODUCTS

PACKERS	DRIVE SHOES
CASING SHOES	PLUGS
CASING HEADS	SWABS
CASING WAGONS	BOILER BURNERS

AND OTHER SPECIALTIES

Refer to COMPOSITE CATALOG . . . Pages 3329 to 3348

For Anything Special Contact

PARKERSBURG MACHINE COMPANY

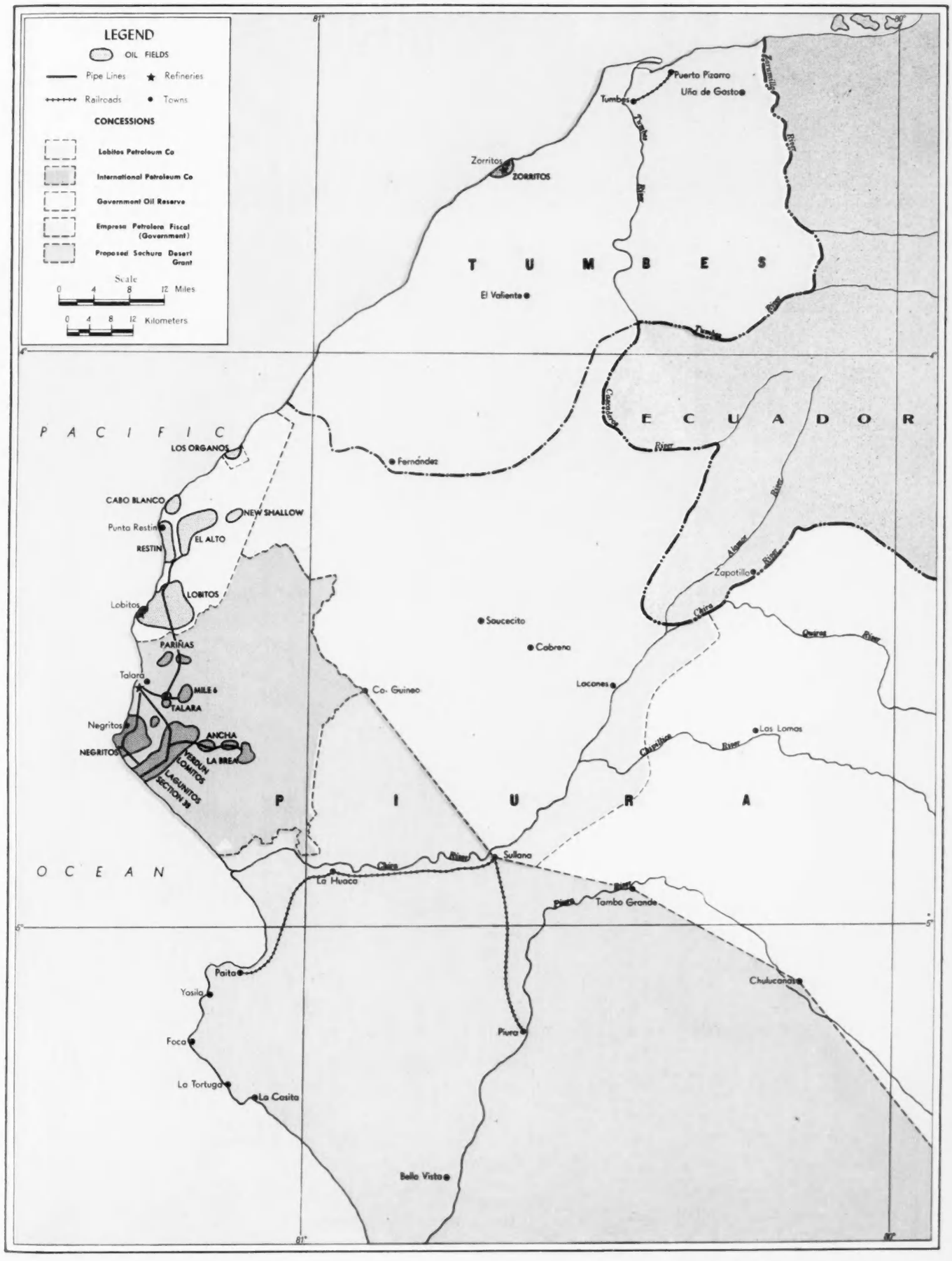
PARKERSBURG, WEST VIRGINIA

Exclusive Export Distributor:

PETROLEUM MACHINERY CORPORATION

30 Rockefeller Plaza, New York 20, N. Y.

PERU—Coastal Fields and Concessions



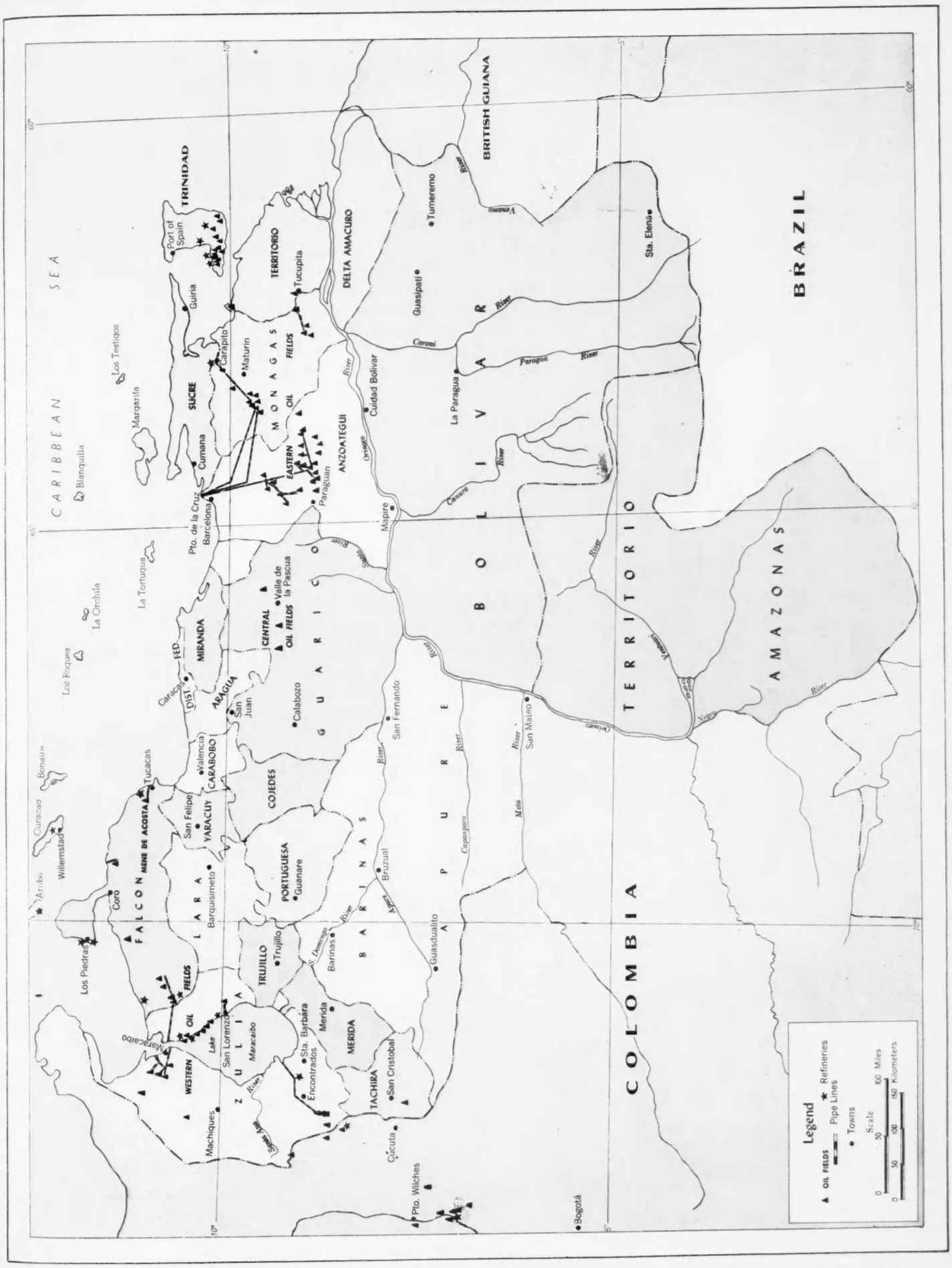
WHAT PRICE A MAP

. . . of the Antilles or Arabia

O R
A T L A N T I C K
LUCAYOS OR BAHAMA ISLANDS
TROPICK OF CANCER
THE ANTILLES OR CARIBEE ISLANDS
THE LEEWARD ISLANDS
TERRA FIRMA

—"The Antilles," by Morten, 1690

VENEZUELA


CARIBBEAN SEA
COLOMBIA
BRAZIL
BOLIVAR TERRITORIO AMAZONAS
GUARICO
BARINAS
PURE
ZULIA
FALCON
LARA
TRUJILLO
MERIDA
TACHIRA
MIRANDA
ARAGUA
CARABOBO
COJEDES
PORTUGUESA
SUCRE
MONAGAS TERRITORIO
DELTA AMACURO
ANZOATEGUI
BRITISH GUIANA
TRINIDAD
Port of Spain
Caracas
Maracaibo
Lake Maracaibo
Willemstad
Curacao
Aruba
Bonaire
Coro
Los Piedras
Tucacas
San Felipe
Valencia
Barquisimeto
Trujillo
Barinas
Merida
San Cristobal
Encontrados
Machiques
Cúcuta
Pto. Wilches
Bogotá
Guasdualito
Bruzual
San Fernando
Calabozo
San Juan
Valle de la Pascua
Mapire
Pto. de la Cruz
Barcelona
Cumana
Guiria
Carupito
Maturin
Tucupita
Margarita
Los Testigos
La Tortuga
La Orchila
Los Roques
Blanquilla
Ciudad Bolivar
La Paragua
Guasipati
Tumeremo
Sta. Elena
San Mateo
Orinoco River
Caroni River
Paragua River
Caura River
Apure River
Meta River
Negro River
Venezuela River
Paraguan River
Barinas River
Santo Domingo River
Sarare River
Escalante River
Catatumbo River
Zulia River
Motatan River
Yuruari River
OIL FIELDS
WESTERN OIL FIELDS
EASTERN OIL FIELDS
CENTRAL OIL FIELDS
FED. DIST.
Legend
Refineries
Pipe Lines
Towns
Scale
Miles
Kilometers

if you continue to drill wells

Sooner or Later

YOU'LL NEED THESE A-1 TOOLS!

The A-1 Rotary-Type Side Wall Core Barrel

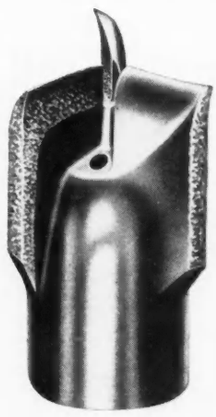
This A-1 tool makes it possible to secure 1¼" O.D. side wall cores from all types of potentially productive formations, hard or soft. These cores can be worked and analyzed for permeability, porosity, oil and water content, chloride content, grain size and gravity. Used in conjunction with electrical well logging, this A-1 rotary-type side wall core barrel has met with such success that operators say you can't afford *not* to use it for the time and money it saves.

The A-1 Combination Casing Mill and Casing Cutter

This A-1 product combines in one tool a positive inside casing cutter and casing mill, used in connection with whipstocking or side tracking out of casing. It is used advantageously for exposing sand sections by milling away casing for gravel packing or open-hole liner setting, particularly in low pressure sand completions. It can also be used in cement squeezing, nitroglycerine shooting for tight sands, milling pipe and stuck wash-over strings.

The A-1 Straight-Hole Bit

This A-1 Straight-Hole Bit combines the best features of a fishtail and a rock bit. It makes faster and straighter hole with light drilling weight in all types of top shales, unconsolidated and broken formations, clays, and medium hard formations. Deviation surveys show this bit drills a 100% straight hole.



A-1 Streamlined Drilling Bits

These bits stay in the hole and give maximum footage. Maximum clearance minimizes the possibility of balling up, and abrasion-resistant watercourse bushings are positioned in the bit body to prevent plugging, and to assure full flushing of the blades.

Detailed information about these and other A-1 products will be furnished upon request.

A-1 Bit & Tool Company

2000 HUSSION STREET, HOUSTON 1, TEXAS

Export Representative: BROWN & BECKLEY, 30 Rockefeller Plaza, New York, N. Y.

VENEZUELA

VENEZUELA'S crude oil production soared to new peaks in 1947, continuing the trend of recent years with a total for the year of 434,885,182 barrels, 12 percent more than it produced in 1946 when that year's peak carried production 14 percent higher than the preceding year. Assurance that new production will keep pace with the trend is seen in the output during the early months of 1948. At the end of 1947 Venezuela was producing at the rate of 1,247,533 barrels daily. During March, 1948, production averaged 1,314,078 barrels and it is apparent that a substantial increase in production will be recorded in 1948.

As the nation produces more, its potential is being kept at

Oil Production and Producing Wells in Venezuela

STATE AND FIELD	Operating Company	Year of Discovery	PRODUCING OIL WELLS END OF 1947			CRUDE OIL PRODUCTION (Barrels)			
			Flowing	Art. Lift	Total Producing	Daily at End 1947	Year 1946	Year 1947	Cumulative Through 1947
EASTERN VENEZUELA:									
Anzoategui									
Guara	Creole Pet., Mene Grande Oil Company	1942	158	16	174	81,198	25,857,201	28,382,729	81,503,298
Guico	Socony-Vacuum Oil Company	1944	49	..	49	18,614	5,496,476	6,221,943	14,401,885
Leona	Mene Grande Oil Company	1940	15	..	15	4,493	1,803,770	1,459,746	26,479,587
Nipa	Creole Pet., Mene Grande, Socony-Vacuum	1945	28	..	28	13,160	992,690	3,853,888	4,852,767
Oficina	Creole Pet., Mene Grande	1933	133	74	207	43,857	13,079,843	15,244,510	104,348,438
Yopales	Creole Pet.	1937	9	..	9	1,873	120,732	673,255	952,463
Pelayo	Venezuelan Atlantic Ref. Co.	1947	1	..	1	.....	.....	18,084	18,084
Caico Seco	Mene Grande	1946	2	..	2	417	..	126,172	126,172
El Roble	Creole Pet.	1939	15	..	15	4,762	1,551,592	1,512,468	12,966,100
Guario	Socony-Vacuum	1940	20	..	20	6,851	1,800,476	2,351,169	6,848,528
Rincón	Texas Pet.	1941	4	..	4	2,066	807,565	795,605	2,421,340
San Joaquín	Mene Grande	1939	33	..	33	10,643	3,748,900	3,870,947	20,387,311
Santa Ana	Mene Grande	1936	2	..	2	440	146,068	238,523	1,223,891
Santa Rosa	Mene Grande	1941	6	..	6	2,718	572,821	974,717	3,726,722
La Ceiba	Mene Grande	1946	2	..	2	380	49,238	53,106	102,344
Quiamare	Mene Grande	1943	2	..	2	405	73,881	79,057	609,858
Guarico									
*Las Mercedes	S. A. Petrolera Las Mercedes	1943	3	..	3	200	63,112	61,554	151,922
†Palacio	S. A. Petrolera Las Mercedes	1947	..	..	..	.....	.....	.....	.....
Tucupido	Venezuelan Atlantic Ref. Co.	1945	2	..	2	.....	6,596	1,736	8,332
Monagas									
Jusepin	Creole Pet.	1938	315	..	315	46,443	19,744,213	18,162,801	92,224,801
Mata Grande (Filven)	Phillips Pet.	1946	15	..	15	1,700	18,894	135,204	154,098
Mulata	Creole Pet.	1941	164	5	169	25,444	10,100,325	9,230,372	37,443,970
Muri	Cía. Consolidada de Pet.	1942	46	16	62	3,600	2,107,229	1,540,369	9,129,886
Pirital	Venezuelan Atlantic Ref. Co.	1944	1	..	1	41	21,984	13,969	70,415
Santa Bárbara	Consolidada, Mene Grande	1941	94	17	111		7,388,440	6,084,430	32,994,635
Travieso	Mene Grande	1944	71	4	75	27,655	4,785,842	4,621,407	13,190,209
Travieso-2	Mene Grande	1944	7	2	9		299,011	281,584	580,595
Capacho	Creole Pet.	1945	..	..	..	.....	.....	.....	7,032
Caritos	Texas Pet.	1939	1	..	1	222	59,617	75,863	336,608
Guanaco		1914	..	..	..	.....	.....	.....	1,855,805
Orocual	Creole Pet.	1933	..	..	..	.....	.....	.....	16,706
Quiriquire	Creole Pet.	1928	69	229	298	57,651	18,336,085	19,936,009	278,279,657
Temblador	Creole Pet., Mene Grande	1936	71	..	71	7,092	2,285,770	2,389,610	24,804,455
Terr. Delta Amacuro									
Pedernales	Creole Pet.	1935	2	..	2	2,621	.....	441,681	9,477,695
Tucupita	Texas Pet.	1945	23	..	23	4,753	401,858	1,501,489	1,918,423
Eastern Totals			1,363	363	1,726	369,299	121,720,229	130,333,997	783,614,032
WESTERN VENEZUELA									
Falcon									
Cumarebo	Creole Pet.		29	21	50	5,000	1,775,236	1,858,749	38,028,732
El Mene	British Controlled Oilfields, Ltd.	1921		23	23	1,266	168,565	164,580	23,662,412
Hombre Pintado	British Controlled Oilfields, Ltd.	1929	2	21	23		228,155	257,619	4,137,698
Media	British Controlled Oilfields, Ltd.	1928	..	..	..	.....	.....	Shut in	1,699,532
Mene de Acosta	Tocuyo Oilfields, Ltd. and North Venezuelan Pet.	1927	..	..	..	.....	.....	Shut in	851,817
Las Palmas	Creole Pet.	1929	..	..	..	.....	.....	Shut in	375,272
Urumaco	Richmond Exploration	.....	..	..	..	.....	.....	Shut in	205,072
Zulia									
Bachaquero	Creole Pet., Mene Grande, Venezuelan Oil Concessions, Ltd.	1938	376	14	390	92,340	18,265,137	32,034,764	85,527,280
Cabimas	Creole Pet., Mene Grande, Venezuelan Oil Concessions, Ltd.	1917	142	823	965	84,570	25,846,940	30,426,974	561,138,536
Lagunillas	Creole Pet., Mene Grande, Venezuelan Oil Concessions, Ltd.	1926	202	1109	1311	319,745	115,896,079	115,673,327	1,524,333,582
Pueblo Viejo	Creole Pet., Mene Grande, Venezuelan Oil Concessions, Ltd.	1940	28	3	31	6,216	2,569,342	2,252,394	6,716,390
Tia Juana	Creole Pet., Mene Grande, Venezuelan Oil Concessions, Ltd.	1928	201	435	636	182,022	63,242,066	65,708,295	493,637,677
Mene Grande	Caribbean Pet.	1913	7	259	266	40,126	13,114,871	13,909,854	308,078,308
Amana	Guasare Oil	1943	1	..	1	(Shut in)	2,384	1,799	12,275
Concepción	Venezuelan Oil Concessions, Ltd.	1925	4	69	73	2,831	1,117,526	1,050,824	31,134,001
La Paz	Venezuelan Oil Concession, Ltd.	1922	21	30	51	96,303	15,296,525	27,404,114	62,021,315
Mara	Caribbean Pet., Texas Pet.	1945	9	..	9	35,491	3,439,049	9,052,828	13,572,337
Netick	Orinoco Oil Co.	1943	2	..	2	231	99,321	92,651	501,342
El Cubo, Las Cruces, Tarra.	Colon Development	.....	12	86	98	8,606	3,768,008	3,262,465	65,697,482
Los Manueles	Colon Development	1927	14	8	22	3,487	1,936,791	1,399,948	38,986,888
Rio de Oro	Colon Development	1916	..	..	..	.....	.....	Shut in	3,873
Rio Palmar (Totumo)	Creole Pet.	1915	..	..	..	.....	.....	Abandoned	141,636
W. Tarra	Colon Development	1947	1	..	1	.....	.....	‡	‡
Western Totals			1,051	2,901	3,952	878,234	266,765,995	304,551,185	3,260,463,457
Total Venezuela			**2,414**	**3,264**	**5,678**	**1,247,533**	**388,486,224**	**434,885,182**	**4,044,077,489**

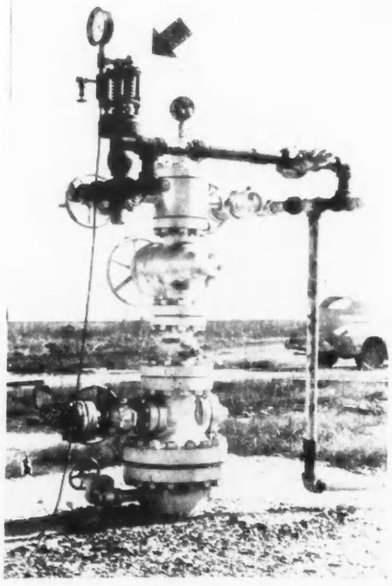
‡ Included with El Cubo, Las Cruces and Tarra. * 60 wells shut in. † 11 wells shut in.

NIXON

SURFACE CONTROL
GAS LIFTS

PROVEN
PRODUCTS

S. F. D.
REGULATORS



Several thousand Nixon Gas Lifts are now in successful operation —lifting fluid economically and dependably.

Operating fundamentally as a gas displacement pump, the Nixon Gas Lift is applicable to all wells—regardless of depth or volume of fluid to be lifted.

Being a closed system, the Nixon Gas Lift can economically produce several average wells on a lease by the use of a small compressor unit. The Nixon way is the modern way of lifting fluid.

The Nixon Selective Flow Differential Regulator operates as an automatic motor valve which controls flow of gas or fluid thru a positive funnel shaped choke, located down-stream from Regulator body. The main valve does not throttle—it is either wide open or fully closed.

The main Ball Valve and Seat assembly can be changed in the field in just a few minutes time with one small wrench, eliminating the necessity of sending the Regulator to the shop for repairs.

Highly resistant to freezing; also used as a Back Pressure Valve; for stop cocking and for well purging.

For complete information on Nixon Gas Lifts and Nixon Regulators write:

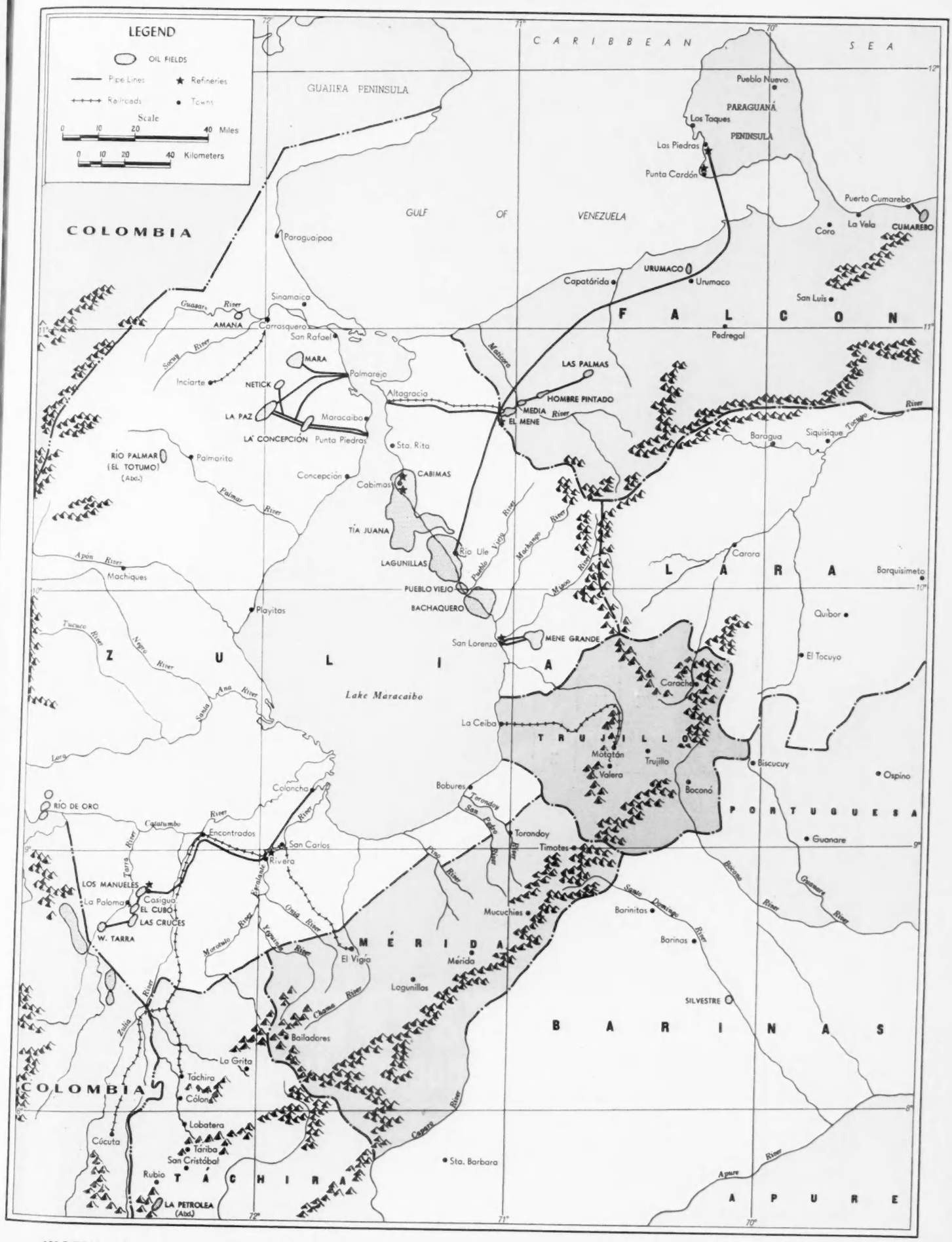
WILSON SUPPLY COMPANY

1412 MAURY ST., HOUSTON, TEXAS

SALES OFFICES: Tulsa, Oklahoma; Dallas, Texas
LOS ANGELES: Western Pressure Control, 5700 Santa Fe Avenue.

BRANCH STORES: TEXAS—Kilgore, Beaumont, Barbers Hill, Bay City, Monahans, Alice, Victoria, Corpus Christi, Columbus. LOUISIANA—Lake Charles, New Iberia, Harvey, Shreveport. ARKANSAS—Magnolia. MISSISSIPPI—Natchez.

VENEZUELA—Western Fields



Youngstown is the word...
YOUNGSTOWN is the word for Quality--a quality uniformly high through the years. It has built for Youngstown Drill Pipe, Casing, Tubing and Line Pipe a reputation for Dependability in toughest service.
QUALITY
YOUNGSTOWN
SERVICE
Youngstown
OIL COUNTRY TUBULAR GOODS
THE YOUNGSTOWN SHEET AND TUBE COMPANY
General Offices Youngstown 1, Ohio
Export Office - 500 Fifth Avenue, New York
PIPE AND TUBULAR PRODUCTS - CONDUIT - BARS - RODS - COLD DRAWN CARBON STEEL ROUNDS - SHEETS - PLATES - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - TIE PLATES AND SPIKES.

VENEZUELA—Continued

a high level through a record volume of drilling and an active exploratory campaign which is showing results in the form of new reserve; and what is quite important, the new reserve being found is in areas where it is readily producible and easy of access to established transportation routes. Although a total of nine new producing areas were opened by wildcats in various parts of the country, the bulk of the new reserve proved during the year was in the extension of presently producing fields.

During the year the operators of properties in Venezuela drilled a total of 787 wells, compared with 627 completions in 1946, and at the end of the year there were 134 rigs actively running in the various fields and wildcat areas. Actually there were more rigs than this in the country, but some in process of movement from field to field or idle for other reasons were not included in the total. During 1947 a great number of new rigs were being purchased for shipment to Venezuela, most of the new ones being heavy-duty equipment capable of drilling to depths of 15,000 feet and more. Also noted in Venezuela is the trend toward more power rigs for use in exploratory drilling operations and in development of some of the proven fields. Ready availability of gas for fuel in many of the fields where development is being carried on at a steady pace keeps the demand for steam rigs at a high level also.

The oldest producing region in Venezuela remains as one of the most active, and by far the most productive. Western Venezuela, including the fields on both east and west sides of Lake Maracaibo, was producing at a rate of 879,234 barrels daily at the close of the year, an increase of more than 137,000 barrels a day more than was being produced from the same area at the end of 1946, and accounting for an amazing total of 304,551,185 barrels or nearly 38 million barrels more than the total for the year 1946. The greater part of this increase came from Bachaquero, a 10-year-old field on the east side of

Drilling in Venezuela

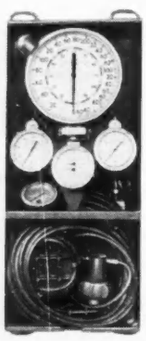
	WELLS COMPLETED IN 1946					WELLS COMPLETED IN 1947					WELLS DRILLING AND SHUT DOWN AT END OF 1947		
				Total					Total				
STATE AND FIELD	Oil	Gas	Dry	Wells	Footage	Oil	Gas	Dry	Wells	Footage	Drilled	SD	Total
EASTERN VENEZUELA:													
Antzoategui													
Guara	38			38	252,560	30		4	34	229,780	2	....	2
Guico	22			22	155,400	12			12	74,340	1	....	1
Leona						1			1	6,970	1	....	1
Nipa	8		2	10	74,080	17			17	127,500	6	....	6
Oficina	11		1	12	79,200	13	1	3	17	112,090	6	....	6
Pelayo						2			2	13,360	1	....	1
Caico Seco	3		1	4	24,301	1			1	6,680	....	....	....
El Roble	1			1	10,240	4			4	41,117	2	....	2
Guario	5			5	39,500	5			5	36,910	1	....	1
San Joaquín	6			6	39,010	7			7	39,900	3	....	3
Santa Ana			1	1	6,230	1			1	6,742	1	....	1
Santa Rosa	2			2	15,064	2			2	14,248	2	1	3
La Ceiba	1			1	9,244	1			1	8,520	....	....	....
Wildcats	2			2	15,027	5		7	12	98,470	5	....	5
Guarico													
Las Mercedes-Palacio	13			13	57,244	39	4	6	49	216,717	5	....	5
Tucupido	1			1	6,855						1	....	1
Wildcats	2		11	13	71,502	2	....	15	17	115,500	5	....	5
Monagas													
Jusepín	90		4	94	489,990	42		3	45	254,540	4	....	4
Mata Grande (Filven)	2		2	4	13,200	12	1	3	16	72,812	2	1	3
Mulata	35		3	38	211,200	37	2	3	42	233,520	3	....	3
Muri	1			1	4,700						....	....	....
Santa Párbara-Travieso	45		3	48	286,632	25		7	32	204,159	3	....	3
Travieso-2	9			9	55,812	1			1	5,670	....	....	....
Quiriquire	15		1	16	85,241	46			46	203,690	6	....	6
Temblador						5		1	6	22,260	3	1	4
Wildcats			12	12	99,632			16	16	132,840	4	1	5
Terr. Delta Amacuro													
Tucupita	6			6	35,400	14			14	83,240	2	....	2
Eastern Totals	318		41	359	2,138,164	324	8	68	400	2,361,575	69	4	73
WESTERN VENEZUELA:													
Barinas													
Wildcat tests			3	3	35,086	1			1	8,650	1	....	1
Falcón													
Cumarebo	2			2	4,635	3			3	12,270	1	....	1
Zulia													
Bachaquero	91			91	336,292	174	1	1	176	651,200	12	....	12
Cabimas	9			9	46,687	5		1	6	31,116	2	....	2
Lagunillas	38			38	213,897	50		1	51	288,150	6	....	6
Pueblo Viejo	16			16	51,210	9		2	11	35,475	2		2
Tia Juana	61		1	62	311,478	76		1	77	386,848	3		3
Mene Grande	12			12	74,064	32		5	37	231,100	2		2
Amana	1			1	5,300								
Concepción											1		1
La Paz	8			8	50,102	3			3	19,532	2	1	3
Mara	3			3	19,230	4			4	29,105	7	2	9
Netick												1	1
El Cubo, Tarra	14		1	15	29,002	7		1	8	19,245	2	....	2
Los Manueles	1			1	4,720						....	....	....
Wildcat tests			7*	7*	59,944	1	....	9	10	86,815	16	....	16
Western Totals	256		12	268	1,241,647	365	1	21	387	1,799,506	57	4	61
TOTAL VENEZUELA	574		43	627	3,379,711	689	9	89	387	4,161,181	126	8	134

* Suspended.

These MARTIN-DECKER Instruments Cover Every WEIGHT CONTROL NEED

● Martin-Decker Instruments accurately control weights, pressures, speeds and other important drilling factors to insure maximum hole per dollar! And they will fit right in with your current development program, whatever your requirements may be. Put them to work on your wells . . . they'll prove the most valuable aid you can find to slice drilling costs.

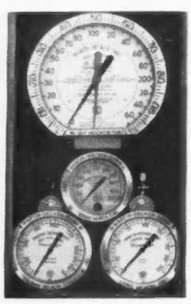
THE SEALTITE Drilling Control Instrument



The master recording instrument for every job where you want full drilling information indicates and records weight, mud pressure, torque and shows rotary table speed. Completely closed and sealed fluid system. Illuminated for night reading. Has capacity to handle 20,000 ft. wells. Gauge readings are smooth, sensitive—always accurate. Available with metric dials if desired.

THE CLIPPER SEALTITE Weight Indicator and Drilling Control Instrument

Provides the driller with information on all of the important drilling factors —not just weight alone. Combines all the advantages of Sealtite construction —ruggedness—accuracy—sensitivity—in a small compact case for jack-knife derricks, folding masts and derricks with limited floor space.



THE CLIPPER TOOL PUSHER Weight Indicator

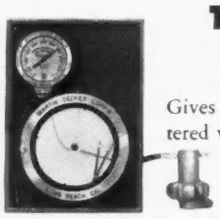
Accurate, easily carried in a car. It can be installed in a minute. Ideal for emergency fishing and drilling jobs.

THE SLIM HOLE Weight Indicator

For shallow field and core testing work not exceeding weights of 150,000 lbs. with six lines.

THE UNITIZED MUD PUMP GAUGE

A compact, self-contained, easy to install instrument for measuring slush pump pressures. Available in 1,000, 3,000 and 5,000 lb. capacities.



THE 2-PEN CEMENT PUMP RECORDER

(For Pressures Up To 15,000 Lbs.)

Gives a detailed record of pressures encountered while putting away the cement in an oil well and the time required for the job.

● *In addition to the products shown here, Martin-Decker also manufactures the following oilfield instruments and equipment:*

The Drilloger, Automatic Rate of Penetration Recorder, Pump Dynomometer, High Pressure Check Valve, Pulsation Damper, High Pressure Hydraulic Booster, Clipper Sealtite Production Models, Vacuum and Steam Torque Gauges.

● *See your Composite Catalog for a detailed description of these products, or write for a copy of the '48 Martin-Decker Catalog!*

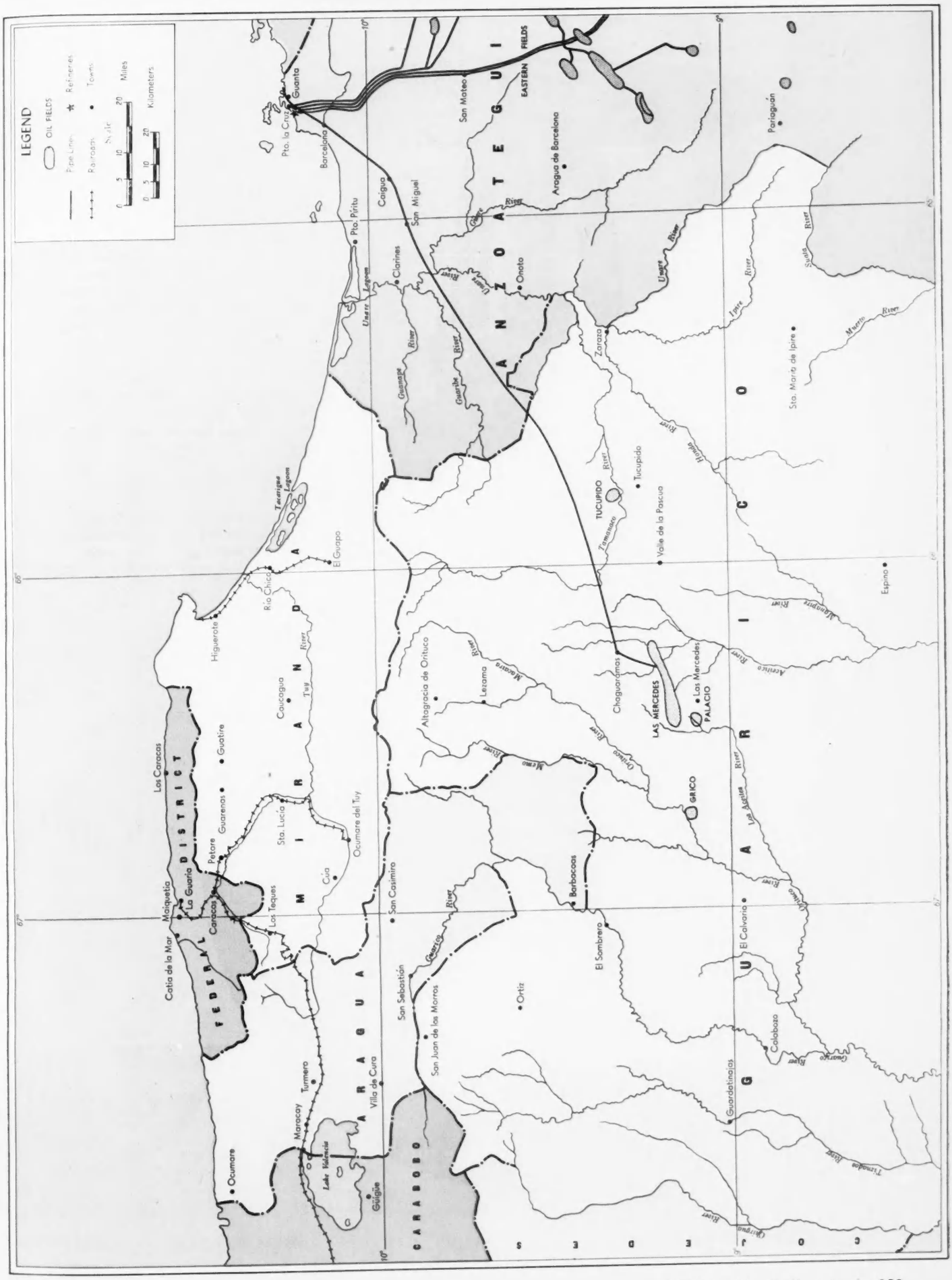
HOME OF THE WEIGHT INDICATOR

MARTIN DECKER CORP.

LONG BEACH, CALIFORNIA

SAN JOAQUIN VALLEY: T. J. CULLEN, BAKERSFIELD, CALIFORNIA
MID-CONTINENT DISTRIBUTOR: REED ROLLER BIT COMPANY, HOUSTON, TEXAS

VENEZUELA—Central Fields



Any Liquid That Can Flow Through a Pipeline Can Be Handled at General American Terminals*

General American Tank Storage Terminals, located at four of America's important ports, constitute the world's greatest public tank storage system for bulk liquid commodities. General American Terminals provide you the same privacy, the same specialized facilities, the same skilled handling as your own private terminal. Check with your nearest General American office and find out how General American Tank Storage Terminals can mean safer, more profitable storage and distribution for your product.

**Here is a Partial List of the Bulk Liquids Handled at General American*

Gasolines	Toluol	Coconut Oil
Lubricating Oils	Benzol	Fish Oil
Naphtha	Xylol	Cotton Seed Oil

GENERAL AMERICAN TANK STORAGE TERMINALS
Division of
GENERAL AMERICAN TRANSPORTATION CORPORATION
135 South LaSalle Street, Chicago

Branch Offices: New York • New Orleans • Washington • Tulsa • Cleveland
Dallas • Buffalo • Houston • Pittsburgh • Seattle • St. Louis • Los Angeles
San Francisco

TANK STORAGE TERMINALS
GENERAL AMERICAN

VENEZUELA—Continued

the lake, and from the La Paz and Mara fields on the west side. The former has had a tremendous increase in development, with 176 wells drilled by the Creole, Shell, and Mene Grande companies during the year—a program which paid dividends in the form of an increase of 13¾ million barrels in annual production. Outpost wells in the Lagunillas and Tía Juana fields, of the Bolivar Coastal Fields group have extended the limits of production much farther into the lake and proved areas of many thousands of acres in addition to that already drilled.

The most outstanding single development in Western Venezuela is an expansion of the newer Cretaceous limestone pay fields first opened by the Shell Group at Mara and La Paz on the west side of the lake. Wells in these areas are proving to compare favorably with Middle East wells in producing ability, and while the presently proved limits of these fields are comparatively small in relation to some of the fields of Iraq, Iran and Saudi Arabia, the producing section at La Paz and Mara is as great or greater. The 11 deep wells in the La Paz field were producing around 100,000 barrels a day at

Engineering and Geological Data on Venezuela Fields

STATE AND FIELD	Proven Area (Acres)	Gravity of Oil A.P.I.	Name	Kind	Age	Depth (Feet) Minimum Top of Pay	Depth (Feet) Maximum to Bottom of Pay	Avg. Thickness of Pay	Type Structure
EASTERN VENEZUELA:									
Anzoategui									
Guara	3350	15-37	Guara	Find sand	Miocene	5200	6560	45	Monocline
Guico	2650	38	Oficina	Find sand	Miocene	5200	7000	40	Monocline
Leona	1100	26	Leona	Lutitas	Miocene	6000	7000	26	Fault
Nipa	1050	33-38	Oficina	Fine sand	Miocene	7100	7600	50	Faulted anticline
Oficina	13500	25	Oficina	Fine sand	Miocene	4590	5900	20	Monocline
Yopales	900	16-42	Oficina	Sand	Miocene	4340	5900	..	Fault
Pelayo	250	30.2	Oficina	Sand	Miocene	7480	8005	..	Anticline
Caico Seco	200	....	Oficina	Sand	Miocene	7140	8500	25	Anticline
El Roble	9100	44	Roble	Sand	Oligocene	7800	10500	..	Anticline
Guario	4000	38-45	Oficina	Sand	Mio.-Olig.	4200	8000	350	Anticline
Rincón	300	42	Oficina	Sand	Miocene	7730	9000	60	Faulted anticline
San Joaquín	7692	43	S. Joaquín	Clay sand	Mio.-Olig.	6230	6560	50	Anticline
Santa Ana	250	34.6	Oficina	Sand	Mio. Olig. Eoc.	4500	8840	180	Faulted anticline
Santa Rosa	1670	42	S. Rosa	Fine sand	Mio. Olig.	7546	10400	20	Anticline
La Ceiba	150	37.3	.....	Sand	Mio. Olig.	5400	7000	20	Anticline
Quiamare	50	39	.....	Sand	Pliocene	....	6400	..	Monocline
Guarico									
Las Mercedes-Grico	7000	32	La Pascua	Sand	Mio. Olig. Cret.	4200	6400	25	Faulted Monocline
Palacio	1000	34	La Pascua	Sand	Miocene	3500	4500	..	Faulted Monocline
Tucupido	500	36	Tucupido	Sand	Miocene	.....	6858	..	Anticline
Monagas									
Jusepín	17000	33	Jusepin	Fine sand	Miocene	4590	4670	82	Anticline
Mata Grande (Filven)	300	25		Fine sand	Miocene	5700	6100	35	Monocline
Mulata	7240	33	Mulata	Fine sand	Miocene	5240	5900	62	Strat. trap
Muri	800	32	Muri	Loose sand	Miocene	3280	3600	43	Monocline
Pirital	50	28	.....	Sand	Miocene	5870	5925	80	Strat. trap
Santa Párbara	2315	27-30	S. Párbara	Fine sand	Miocene	5900	6560	125	Monocline
Travieso	2500	33	La Pica	Sand	Miocene	5500	6450	75	Anticline
Travieso 2	500	31	.....	Fine sand	Miocene	5600	6200	40	Monocline
Caritos	200	30.5	Oficina	Sand	Miocene	5650	....	..	.....
Quiriquire	12250	19	Quiriquire	Clay sand	Pliocene	2624	4900	157	Faulted Monocline
Temblador	4600	21	Oficina	Fine sand	Miocene	3600	3930	43	Fault
Terr. Delta Amacuro									
Pedernales	972	21	Pedernales	Loose sand	Miocene	1550	2500	248	Anticline
Tucupita	600	16.5	.....	Loose sand	Miocene	5550	6000	35	Anticline
WESTERN VENEZUELA:									
Falcón									
Cumarebo	540	48	Socorro	Lent. sand	Miocene	1950	3000	30	Anticline
El Mene	1008	33	Agua Clara	Sandstone	Miocnee	1120	1600	50	Anticline
Hombre Pintado	92	24	Agua Clara	Sandstone	Miocene	2460	2630	60	Anticline
Media	62	34	Agua Clara	Sandstone	Miocene	3280	3900	50	Fault
Mene de Acosta	....	..	El Salto	Sand	Oligocene	970	2046	30	Anticline
Las Palmas	50	34	Monte Claro	Sand	Oligocene	2750	....	55	Anticline
Zulia									
Bachaquero	19000	13-17	Lagunillas Icotea	Clay, sand	Mio.-Olig.	2800	6000	13-110	Monocline
		14	Lagunillas Icotea	Clay, sand	Mio.-Olig.	2800	6000	98-215	Monocline
Cabimas	4500	15-27	Lagunillas Icotea	Clay, sand	Mio.-Olig.	1600	3600	15-100	Monocline
Lagunillas	60000	16-30	Lagunillas Icotea	Clay, sand	Mio.-Olig.	2500	5500	66	Monocline
		11-18	Lagunillas Icotea	Clay, sand	Mio.-Olig.	2500	5500	14-144	Monocline
Pueblo Viejo	3750	21	.....	Sand	Eocene	1850	3000	75	Anticline
Tía Juana	43000	13	Lagunillas	Clay, sand	Miocene	2850	5000	164	Monocline
Mene Grande	8645	22	Pauji	Clay, sand	Miocene	3050	4550	60-540	Anticline
Amana	500	31.5	.....	Sand	Eocene	3188	4500	40	Anticline
Concepción	2470	37	Concepción	Sandstone	Eocene	1700	....	410	Anticline
La Paz	1359	24-34	La Paz, La Luna, Cogollo	Sandstone, Limestone	Eoc.-Cret.	1900	2950	180	Anticline
Mara	1500	29.5	Cogollo	Limestone	Cretaceous	6400	7800	1500	Anticline
Netick	250	29.2	Harqueta	Sand	Eocene	5860	6097	..	Faulted anticline
El Cubo, La Cruces, Tarra	2470	19-33	Mirador	Sandstone	Eocene	2300	6350	65-213	Monocline
Las Manueles	420	30-39	Mirador	Sandstone	Eocene	3900	....	39	Dome
W. Tarra	500	41	.....	Limestone	Cretaceous	6900	8400	..	Anticline
Río de Oro	100	38	Río de Oro	Sand, lime	Cretaceous	....	1850	..	Faulted

"Standard of the Industry"

THE LAYNE

MILLED GROOVED • WIRE WRAPPED SCREEN

•

Layne Screens offer a freer passageway for the fluid after it leaves the screening point of the wire. The flat bottomed "V" shaped wire is wrapped directly on to the pipe.

Offers a choice of Galvanized Steel; Admiralty Brass; Bronze or Stainless Steel Wire. Made on any size or length of pipe with plain drilled holes, milled groove openings or vertical slotted openings.

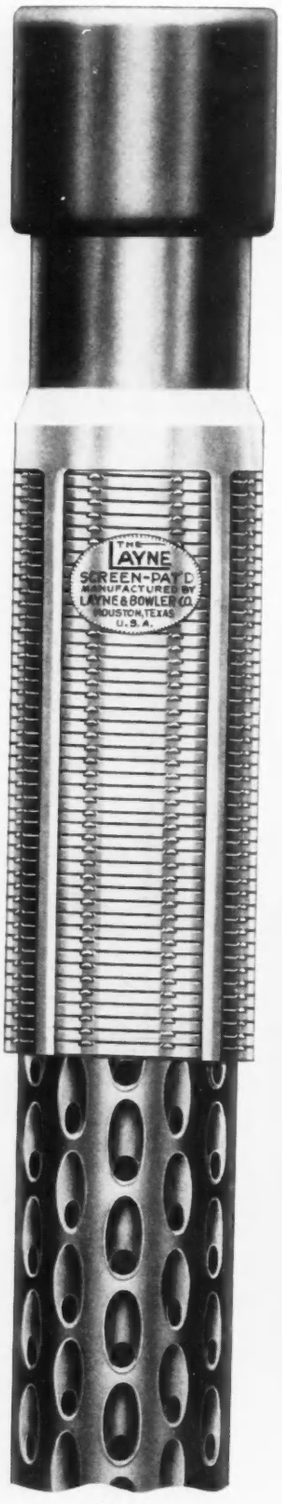
•

TUBING SET PACKER

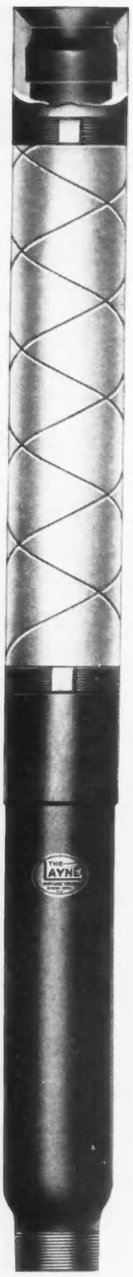
•

Allows you to set Screen—Liner—Packer with tubing—makes one trip in the hole do the work of two. The Set Shoe, Screen, Liner and Packer are run in the casing with the tubing connected in the Signal Closing Set Shoe and not the Packer. It is fool proof—Packer has 36" of canvas packing and it sets with the Sleeve down.

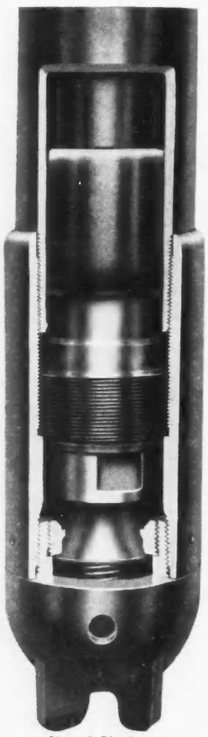
•



Screen



Tubing-Set Packer


Signal Closing Set Shoe

Collapsing Tool

Letting-in Tool

Write for Complete Information

THE LAYNE AND BOWLER COMPANY

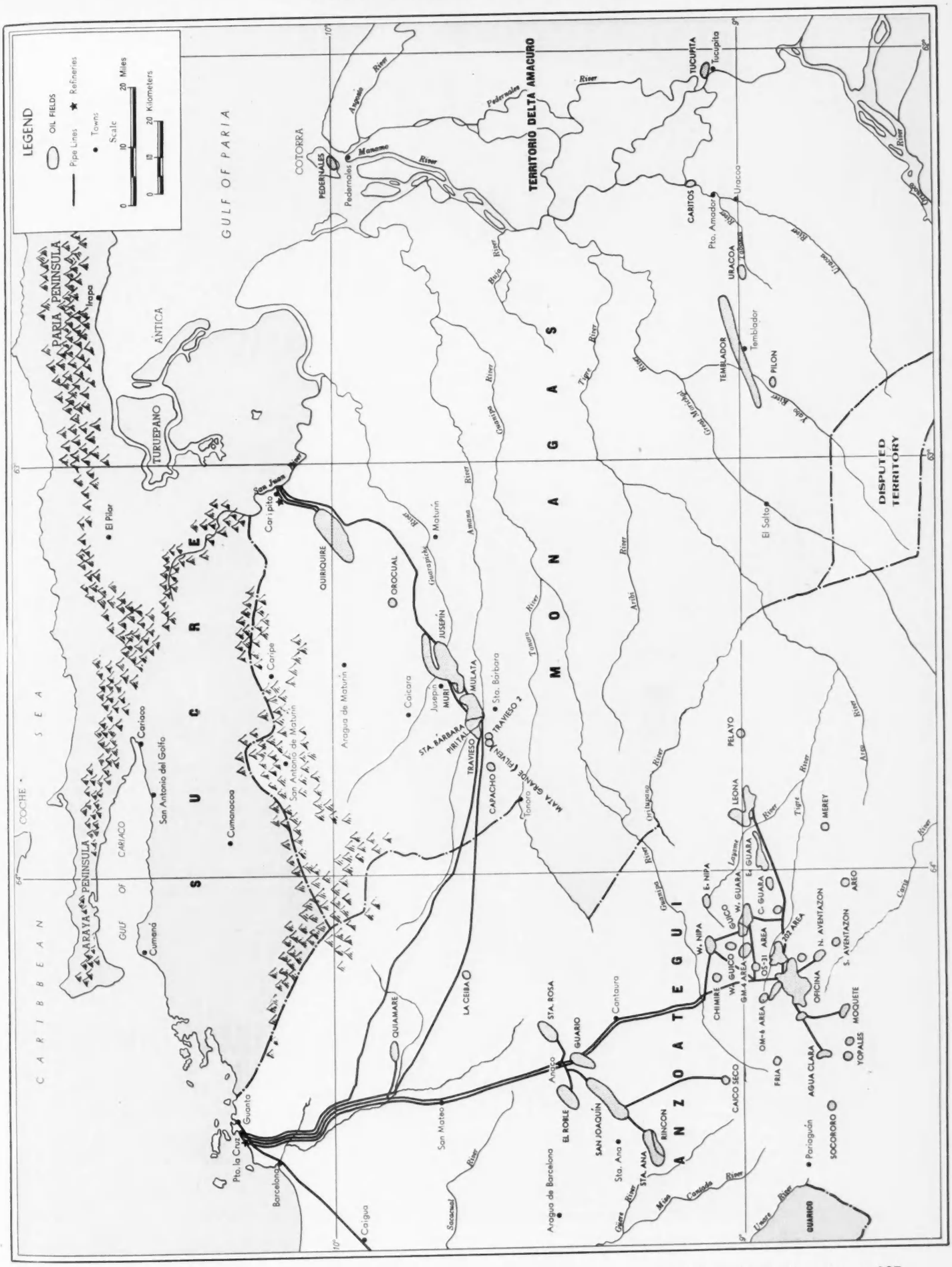
EXPORT:
Jeff Tucker
Room 1636
30 Rockefeller Plaza
New York, N. Y.

General Office & Factory

8000 Market Street **Houston, Texas**

WEST COAST:
Layne & Bowler Corp.,
900 Santa Fe Ave.,
Los Angeles, Cal.

VENEZUELA—Eastern Fields



Our new exclusive export sales rights now permit us to sell and service Cummins Diesel Engines for the petroleum industry in any part of the world. Our years of experience will be of great value in assuring you satisfactory service on these dependable engines. Your Diesel power and oil field supply problems are our problems. Consult us for your requirements. Delivering most items from stock.

CUMMINS DIESEL

SINCE 1919, PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS

Offices:

FORT WORTH, TEXAS
HOUSTON, TEXAS
LOS ANGELES, CALIF.
SAN ANTONIO, TEXAS
NEW ORLEANS, LA.
TULSA, OKLA.
SERVICE MANAGERS AT
CARACAS, VENEZUELA
BOGOTA, COLOMBIA

MID-CONTINENT CUMMINS EXPORT CORPORATION

42 BROADWAY, NEW YORK CITY 4, U.S.A.

CABLE ADDRESS - MIDCUMPORT - NYK
PHONE WHITEHALL 30313

the end of the year, while the 9 producers at Mara were making around 40,000 barrels daily, being held in through agreement of the operators. Shell's West Tarra wildcat in the extreme southwest near Los Manueles and Las Cruces was completed during the year from the same formation and was producing 1500 barrels daily at the end of the year, the amount of available transportation capacity.

A great deal of interest has been focused on the operations of Richmond Exploration Company which is prospecting a large block between the La Paz-Mara and the Tarra area. Since the block was up for selection in May of 1948, Richmond had released very little information on its findings in the series of deep wildcats beyond the fact that at least three of them are capable of producing some oil, and it is reported that its Zulia 26-1 has been completed as a discovery in the Cretaceous at a depth of 11,540 feet. Two of the wells were drilled to 14,000 feet.

Perhaps the most important development of the year in Eastern Venezuela was the more than half billion barrels of new reserve proved in extension and deeper drilling in the Quiriquire field, where wells drilled deeper found the original pay zone of the field much more extensive than it had been known to be through most of the 20 years the field has been producing. It has brought a new drilling boom to the field with six rigs active and 46 wells completed during the year. The year also saw resumption of drilling in the Temblador field, inactive except for producing operations for the past several years. Four rigs have been moved in, and it is estimated that more than 100 wells will be needed to complete development of the proved area. Also during the latter part of 1947 operations were resumed in the Pedernales field. This area has been closed in for the past five years because of its remote location in the Delta Amacuro and easier operation in the more accessible fields. One rig has been moved in which is scheduled to drill a 12,000-foot well in the area which normally produces from around 7500 feet. Pedernales 10, completed five years ago and closed in immediately after testing at a rate of 2400 barrels a day, was opened up recently and immediately started producing more than 2000 barrels daily.

Jusepin field, in recent years on of the most active in Eastern Venezuela, has about completed development and is now operating only three rigs, drilling just enough new wells to balance the normal decline and keep production around 47,000 to 50,000 barrels daily. The same is true for the remainder of the group which includes Jusepín, Mulata, Muri, Santa Bárbara and Travieso, with the exception of Mata Grande, which is still in process of definition, having only recently completed a small pipe line outlet to tie in to the trunk line to the Puerto la Cruz area.

The Greater Oficina and San Joaquín areas remained active during the year, with the group of Oficina, Guara, Guico, Nipa, Leona and Yopales accounting for a production of 55,836,071 barrels during the year. Exploration during the year accounted for the opening of new producing areas on the same type of fault structures, most of which were still one-well areas at the end of the year and still not evaluated.

The State of Guarico, while receiving a setback with failure of Creole's operations in the Sombrero area, was quite active during 1947. The Las Mercedes company stepped up its program in Las Mercedes and the new Palacio area to build up potential for the new pipe line now under construction, and also carried on wildcatting in several areas. The exploratory program at the close of the year saw 10 active wildcat and extension tests drilling in Guarico with Creole, Phillips, Atlantic, Texas Petroleum and Sinclair all participating.

New Pipe Lines and Refineries

Two new pipe lines were completed during 1947 in addition to work on existing lines, and beginning of construction of other important transportation projects. The Shell Group completed another 12-inch line from Mara field to the terminal at Palmarejo where a new loading dock and additional tankage are already barely sufficient to take care of the volume now being produced from the Western fields of La Paz and Mara. In September Socony-Vacuum Oil Company completed a 103-mile 12-inch line from Guico in the Oficina area to terminal facilities at Guanta. Under construction are a 144-mile 24-26-inch line being built by Creole from Río Ule station in the Lake Maracaibo area, to the Amuay Bay refinery area. This line is designed to carry some 300,000 barrels daily now handled by tanker and allow tankers to handle increases in output. The S. A. Petrolera Las Mercedes company is building a 157-mile, 16-inch outlet to the Las Mercedes field which will have initial capacity of 64,000 barrels daily.

During 1947, with work already well under way on Creole's new 60,000-barrel refinery at Amuay Bay and Shell's 40,000-barrel plant at Punta Cardón, both on Paraguaná Peninsula, work was started by Venezuela Gulf Refining Company on a 20,000-barrel refinery at Puerto la Cruz, and is scheduled to get under way soon on a 35,000-barrel refinery at Puerto la Cruz for the Sinclair organization.

Creole's refinery at Caripito, now rated at 70,000 barrels throughput capacity daily, will be enlarged during 1948 and 1949 to increase its capacity to 90,000 barrels daily.

It has been reported that the Venezuelan Government is planning to build a refinery of 20,000-barrel capacity, most of the products from which are scheduled for delivery to Argentina.

Netherlands West Indies Refineries

A large part of Venezuela's production is refined in the great plants on the islands of Aruba and Curaçao, off the northern coast. On Aruba, Lago Oil and Transport Company operates a plant with a capacity of 360,000 barrels daily while Shell Group's Arend Petroleum Mij. plant processes 35,000 barrels daily.

On Curaçao, another of the Shell Group, N. V. Curacaosche Petroleum Industrie Maatschappij, operates a refinery which averages throughput of 275,000 barrels a day.

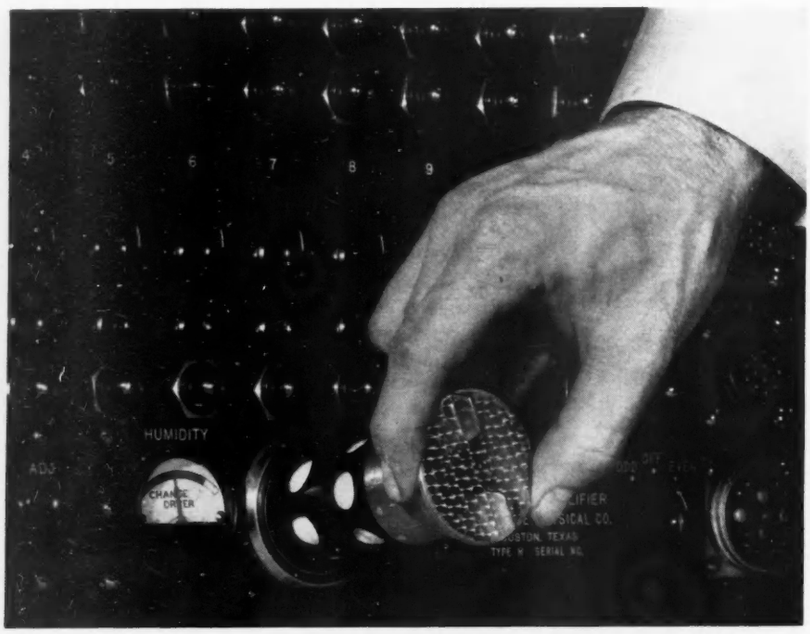
REFINERIES OF VENEZUELA (Eastern and Western)

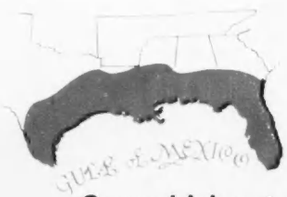
COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery	Operating Status
OPERATING					
British Controlled Oilfields, Ltd.	Mene de Mauroa	250	.....	Skimming	Operating
	Caripito	70,000	35,000	Complete	Operating
Creole Petroleum Corp.	La Salina	12,000	.....	Skimming	Operating
Mene Grande Oil Co.	Cabimas	1,800	.....	Skimming	Operating
	Oficina	930	.....	Skimming	Operating
	San Lorenzo	37,800	.....	Skimming	Operating
Shell Group	Casigua	700	.....	Skimming	Operating
	La Rivera	200	.....	Skimming	Operating
	El Calvario	200	.....	Skimming	Operating
Socony-Vacuum Oil Co.	Guario	120	.....	Skimming	Operating
Total	10 Plants	123,900	35,000		
BUILDING AND PLANNED					
Creole Pet. Corp.	Bay of Amuay	60,000	*7,000	Complete	Building
Shell Group	Punta Cardón	40,000	40,000	Complete	Building
Sinclair Oil Co.	Puerto la Cruz	35,000	.....	Complete	Planned
Venezuela Gulf Ref. Co.	Puerto la Cruz	20,000	.....	Complete	Building
Total Planned and Building	4 Plants	155,000	47,000		
Total Venezuela	14 Plants	278,900	82,000		

* Hydroforming capacity.

Announcing a New General Geophysical Development . . .

A COMPLETELY PORTABLE SEISMIC UNIT, CLIMATE-PROOFED *for* TROPICAL CONDITIONS



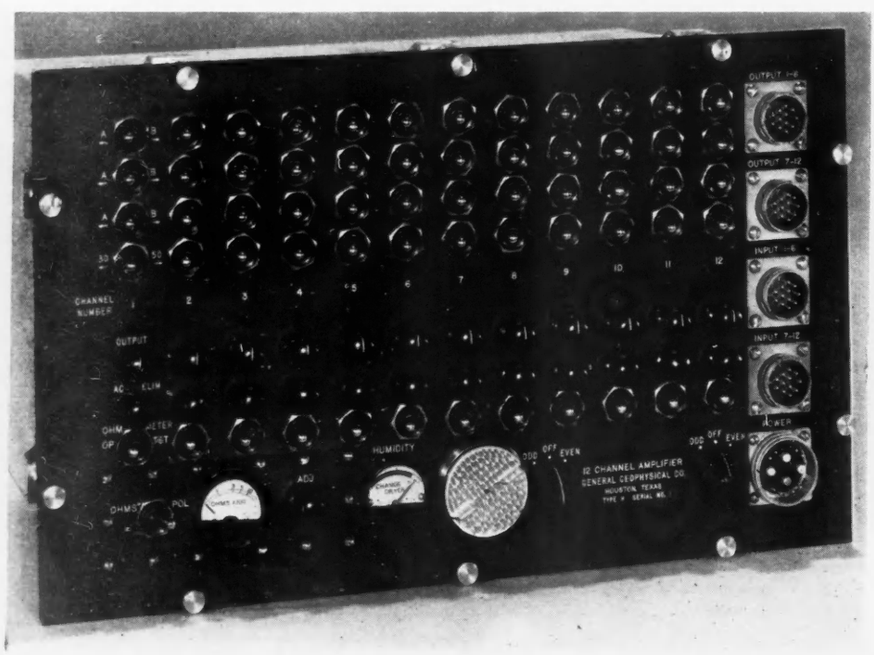


This new General portable seismic unit . . . the result of more than two years of continuous research in General laboratories and exhaustive testing in the field . . . has new, proved exclusive features never before offered in any other portable seismic unit.

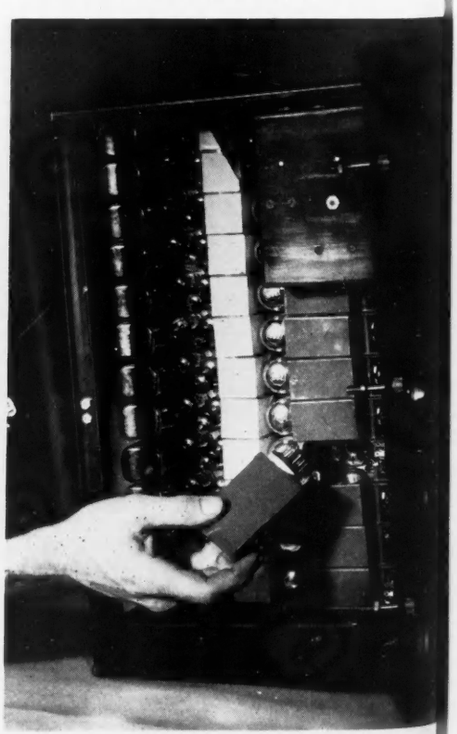
However, the new portable General unit does not sacrifice the standards of performance characteristic of other General instruments.

• **EXCLUSIVE CLIMATE-PROOFED DESIGN**—The drying element being inserted maintains a dry atmosphere inside each case. Humidity meter indicates when drying element should be replaced.

• **12 CHANNEL AMPLIFIERS**—Two 12-channel amplifiers are provided to permit the use of a maximum of 24 traces. Bulky "B" batteries have been replaced by dynamotor power supply.



• **UNITIZED PLUG-IN CONSTRUCTION**—Each channel consists of a 5 tube amplifier with all electronic components "potted" and sealed in 8 individual plug-in units. All field crews are provided with ample spare units. Complete standardization and interchangeability of all elements insures field maintenance equal to laboratory servicing.



ALBANIA

CRUDE oil production in Albania, coming largely from the Devoli fields, had reached a peak of 4775 barrels daily during 1942. During 1947 production from Albania amounted to only 365,000 barrels, and it is not likely that this may be increased during 1948. The industry was nationalized and has set up a program of rehabilitation and exploration in an effort to increase Albania's output. In addition to the Devoli fields, small production was obtained from the Pahtoso area to the south. Most oil comes from Miocene producing formations at depths between 1640 and 2620 feet.

Albania has one small refinery, capable of processing 750 barrels daily, located at Berat, near the producing area. Most production during peak years was moved to the Adriatic port of Valona through a 46-mile, 8-inch pipe line.

AUSTRIA

AUSTRIA, within the past ten years has become the second most important producing country in Eastern Europe. In 1938, when the Germans occupied the country, there were only three small producing fields with total output of approximately 1100 barrels daily. After the annexation exploration and development was stepped up appreciably, and by 1943 the number of fields had increased to 12. Production during 1947 was 6,683,628 barrels, or 705,696 barrels more than the preceding year, but well below the peak of 8,318,436 barrels reached in 1944.

All of the Austrian oil fields are located in the Vienna Basin along a major fault system known as the Steinberg Fault. Most of the fields are accumulations in traps formed by the fault plane on the west and anticlinal conditions against the fault. Production is mostly from the Miocene, with some oil found in the Oligocene or Cretaceous. All fields are reported to have been produced at uneconomic rates during and since the war. All production is located in the Soviet zone of occupation, along with a substantial part of the refining capacity.

Since the producing areas are under Soviet control, very little information on drilling was made available, other than

Refineries of Austria

COMPANY	Location of Plant	Total Charging Capacity Barrels Daily	Type of Refinery	Operating Status
Aktiengesellschaft de Shell-Floridsdorfer Mineralölfabrik (Shell)	Floridsdorf (Vienna) (Soviet Zone)	2,800	Skim, lube, asphalt	Operating
Vacuum Oil Co., Aktiengesellschaft (Socony-Vacuum)	Kagran (Vienna) (Soviet Zone)	2,500	Skim, lube, asphalt	Operating
*Oesterreichische Mineralölwerke Gesellschaft m.b. H. (Shell-Socony-Vacuum)	Lobau (Vienna) (Soviet Zone)	5,600	Skimming	Operating
*"NOVA", Mineralölraffinerie Aktiengesellschaft	Schwechat (Vienna) (Soviet Zone)	3,500	Skim, crack, lube, asphalt	Operating
*Aktiengesellschaft der Kohlenwertstoffverbaende Gruppe *Bezin-Benzol Verband* (BV)	Vösendorf (Vienna) (Soviet Zone)	2,500	Skim, lube, asphalt	Operating
*Korneuburger Mineralölraffinerie Aktiengesellschaft (Gasolin)	Korneuburg (Vienna) (Soviet Zone)	5,600	Skim, lube, asphalt	Operating
*Donau Oel Gesellschaft m.b.H.	Mosbierbaum (lower Austria near Tulln) (Soviet Zone)	3,500	Skim, lube, asphalt	Operating
Deutsche Erdölwerke	Ebensee (Upper Austria near Linz) U.S. Zone	2,200	Skimming	Shut Down
Total—8 Plants		28,200		

* Soviet claimed and operated.

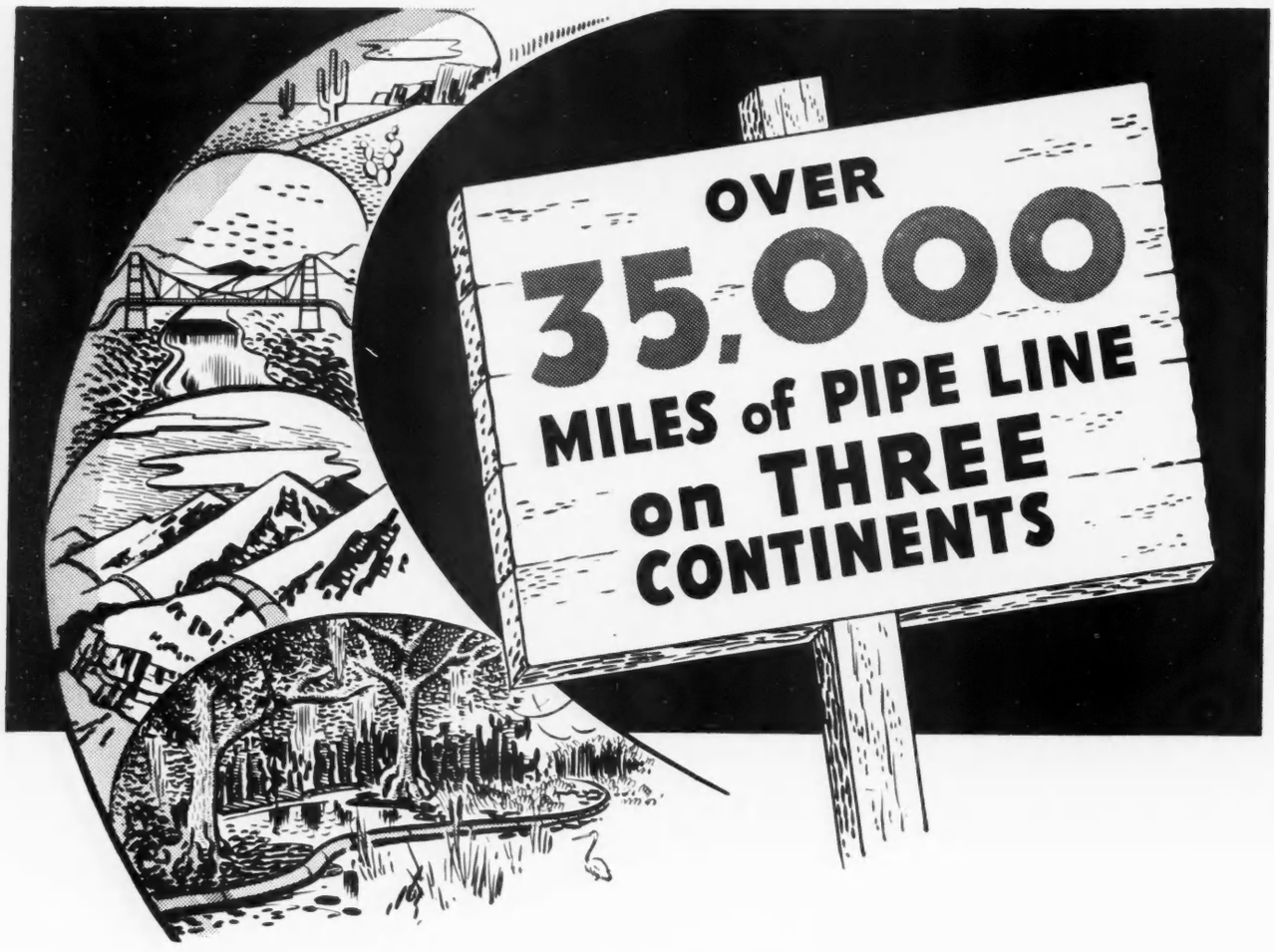
Oil Production and Producing Wells in Austria

Province and Field	Operating Company	Year of Discovery	Producing Wells O. and G.	CRUDE OIL PRODUCTION (Barrels) 1946	1947	Cumulative Through 1947
Lower Danube						
Aderklaa	*S.M.O.A.	1942	4	5,000	8,000	22,000
Alt Lichtenwart		1940	2†			
Gaiselberg	Rohoelgew. A.G.	1938	60	994,000	956,000	10,057,000
Hohenruppersdorf	S.M.O.A.	1941	5	3,000	37,000	64,000
Maustrenk	S.M.O.A.	1941	44	272,000	165,000	1,066,000
Mühlberg	S.M.O.A.	1942	18	797,000	1,550,000	2,930,000
Neusiedl	S.M.O.A.	1936	4			153,000
Oberlaa		1932	2†			
Scharfeneck	S.M.O.A.	1944	2	9,000		21,000
St. Marx		1944	1†			
St. Ulrich-Hauskirchen	S.M.O.A & R. V. Van Sickle	1938	343	2,710,000	2,755,000	17,604,000
Van Sickle	S.M.O.A.	1939	48	292,000	260,000	4,929,000
Zistersdorf (Rag & Gösting)	Rohoelgew. A.G. & Erdölproduktions G.m.b.H.	1930	86	915,932	952,028	10,383,664
Upper Danube						
Leoprechting	"Pram" Erdölexplorations G.m.b.H.	1906	10		600	2,000
Wels		1891-1944	3†			
Total			546	5,997,932	6,683,628	47,231,664

* Soviet Mineral Oil Administration.
† Gas wells.

Engineering and Geological Data on Austria Fields

PROVINCE AND FIELD	Proved Area (Acres)	Range of Gravity (A.P.I.)	Name	Kind	Age	DEPTH (Ft.) Minimum to Top of Pay	Maximum to Bottom of Pay	Average Thickness of Pay (Ft.)	Type of Structure
Lower Danube									
Aderklaa		48.8-gas	Helvet-Schlier	Sand	Miocene	7977	8535	85	Buried hill
Alt-Lichtenwart		Gas	Sarmat-Torton	Sand	Miocene	2886	3644	115	Fault structure
Gaiselberg	200	21.5-27.5	Sarmat-Torton	Sand	Miocene	2066	7724	387	Fault structure
Hohenruppersdorf		35.0	Sarmat-Torton (Flysch)	Sand, Sandstone	Miocene (Cret.)	3323	5366	98	Fault structure
Maustrenk	200	26.5	Helvet-Schlier (Flysch)	Sand, Sandstone	Miocene (Eoc.)	2756	3297	164	Stratigr. trap
Mühlberg		30.5	Pannon, Sarmat-Torton	Sand	Miocene	1490	5315	476	Fault structure
Neusiedl		31.5	Flysch	Sandstone	Eocene	4003	4101	20	Anticline
Oberlaa		Gas	Torton	Sand-conglomerate	Miocene	820	873	13	Buried hill
Plattwald		21.5	Torton	Sand	Miocene	3255	5190	56	Fault structure
Scharfeneck		24.0	Helvet-Schlier	Sand	Miocene	3251	3317	66	Stratigr. trap
St. Marx		Gas	Torton	Sand	Miocene	2343	2395	52	Fault anticline
St. Ulrich-Hauskirchen	2000	31.5	Helvet-Schlier (Flysch)	Sand, Sandstone	Mio., Eoc.	2723	3773	394	Buried hill and anticline
Van Sickle		21.5-27.5	Sarmat-Torton	Sand	Miocene	1312	4593	459	Fault structure
Zistersdorf	100	20.7-27.5	Sarmat, Torton, Flysch	Sand, Sandstone	Miocene	2165	7720	518	Fault structure
Upper Danube									
Leoprechting		12.9	Burdigal-Schlier	Sand	Miocene	394	472	33	Stratigr. trap
Wels		Gas	Burdigal, Helvet-Schlier	Sand	Miocene	476	1499	33	Stratigr. trap



. . . PROOF OF PERFORMANCE

PIPE LINE ENGINEERS CONTRACTORS
Williams Brothers Corp.

Pipe lines—35,000 miles of them—built in the last 33 years on three continents are proof of Williams Brothers' performance.

Equipped with the most modern machinery, materials and supplies under the direction of trained engineers, skilled mechanics and construction crews, Williams Brothers has mastered the hazards and construction problems of swamps, rivers, deserts and mountains.

Discuss your pipe line construction problems with Williams Brothers. You'll find engineers and specialists eager to aid you and you'll find Williams Brothers' "Proof of Performance" will serve you better.

WILLIAMS BROTHERS CORP.

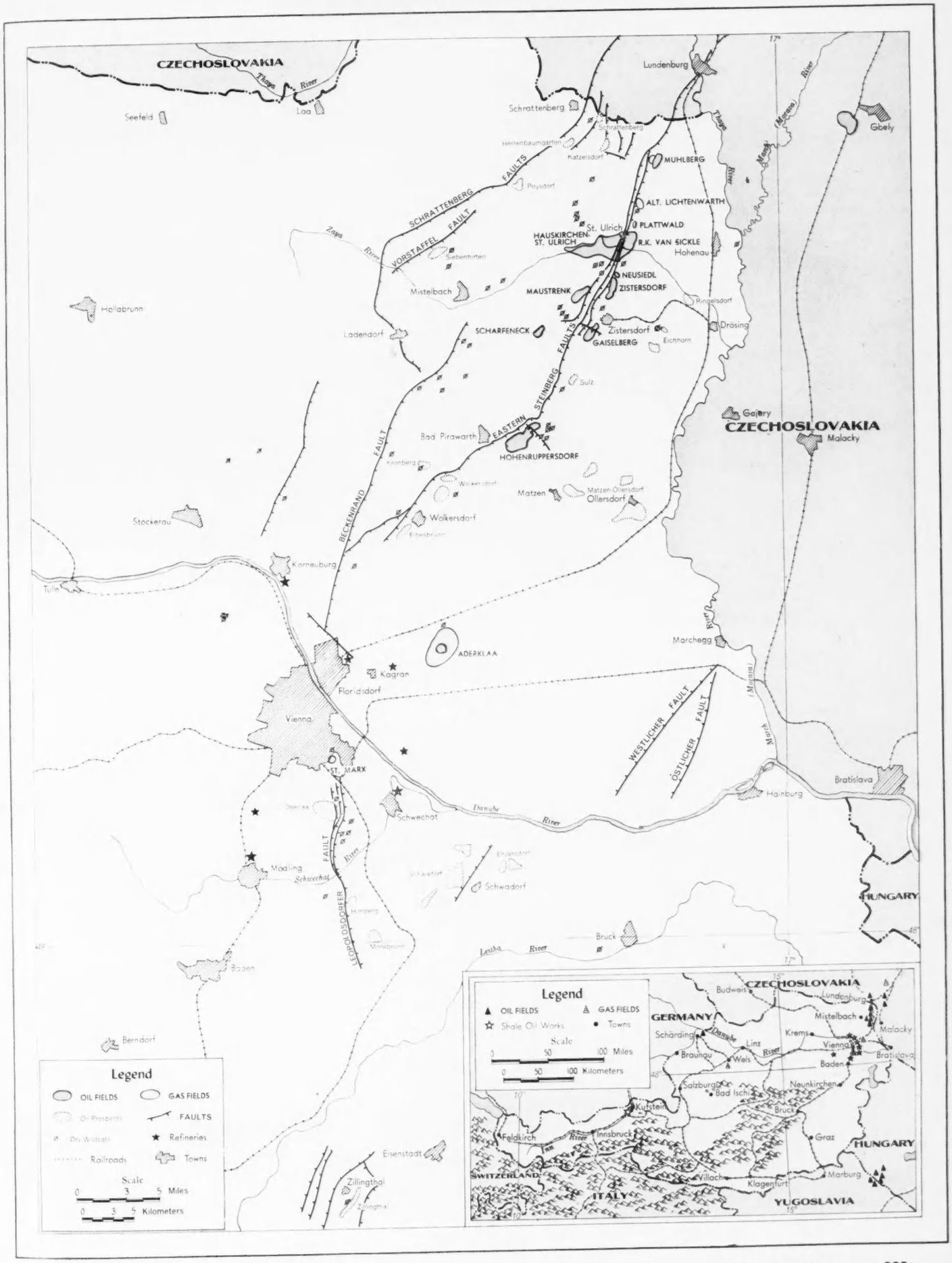
ENGINEERS—CONTRACTORS

Oil • Gas • Gasoline • Water

Pipe Lines and Pump Stations

NEW YORK • TULSA • ATLANTA • HOUSTON

AUSTRIA—Vienna Basin Fields



Behind every SUCCESSFUL COMPLETION *Stands* SUCCESSFUL EXPLORATION

. . . . . and behind Successful Exploration stands ACCURACY in Seismic and Photogravity Mapping

Careful analysis and interpretation of each phase of seismic and gravity exploration assures Republic's clients of consistently accurate information on which to base successful drilling operations.

Working with the most advanced-design in exploratory equipment, such as the new Photogravity Camera, Republic's skilled and experienced personnel offer the utmost in steady, dependable, economical service.

Rx

REPUBLIC EXPLORATION COMPANY

TULSA, OKLAHOMA

Write for our newly-published booklet on Photogravity Mapping

AUSTRIA—Continued

the fact that about five wells were completed in producing fields, and no exploratory wells were completed.

Outside of the Vienna Basin, a number of other Austrian areas appear to have the necessary conditions favorable to oil accumulation, including the Mollasse-trough area of Upper Austria in the Alps Foothills, the Graz Basin, and Burgenland in Southeastern Austria. These have been prospected by deep wildcat wells, about exploratory tests having been drilled since 1935, but no commercial oil was found.

A 217-mile 8-inch products pipe line was constructed from the Wifo storage plant near Lobau, to Melnik in Czechoslovakia, with an extension to Prague. It was laid by agencies of Germany's Air Force during the war, but was never used prior to the end of the war as the booster station pumps had not been installed at that time. It now belongs to the Soviets as war reparations.

Since Russian occupation none of the American and British firms have made an effort to carry on any development work, since stocks of tubular goods were taken over by the occupying forces, and under present conditions do not wish to bring in new equipment. Reports say that the Soviets have brought no equipment in for the fields they have seized, but they have taken over the equipment on the ground in addition to seizing material from other properties.

Early in 1948 it was reported that the Russians were constructing a new hydroforming plant at Moosbierbaum for the production of high-octane gasoline, expected to have a capacity of 2700 barrels daily.

BELGIUM

Belgium's refinery capacity, a large proportion of which was destroyed or severely damaged during the war, is now back to something like two-thirds of the prewar capacity with five plants now in operation and capable of processing 7534 barrels daily. Belgo Petroleum, S.A.'s plant at Terdonck, which had a capacity of 2150 barrels before the war has never been rebuilt after being completely destroyed. All of the plants are not yet on full stream, being handicapped by lack of steady crude oil supply.

BULGARIA

The Bulgarian oil industry, nationalized by decree published in December of 1947, is now being operated by Government agencies. Oil interests affected have been principally marketing facilities, since the nation has no oil production and only three small refineries, located in the Ruse area. The most favorable areas for oil prospecting have been in the Provadia district, the Prin Mountains and in the Planina region where indications of oil or shale deposits have been reported.

CZECHOSLOVAKIA

AT THE END of 1947 it had become apparent that Czechoslovakia was going to be unable to meet its goal of 1,354,000 barrels yearly set up under its Two-Year Plan. Despite efforts to increase activity in its producing areas, there has been no appreciable increase in its production since the close of the war, and there have been no discoveries of sufficient magnitude to indicate any change in the situation. The output for 1947 was only 670 barrels a day, annual total being 245,000 barrels, and bringing the cumulative production from the nation during its producing history to 4,145,000 barrels, chiefly from the Gbley and Hodonin fields which are a northeast extension of the Vienna Basin of Austria.

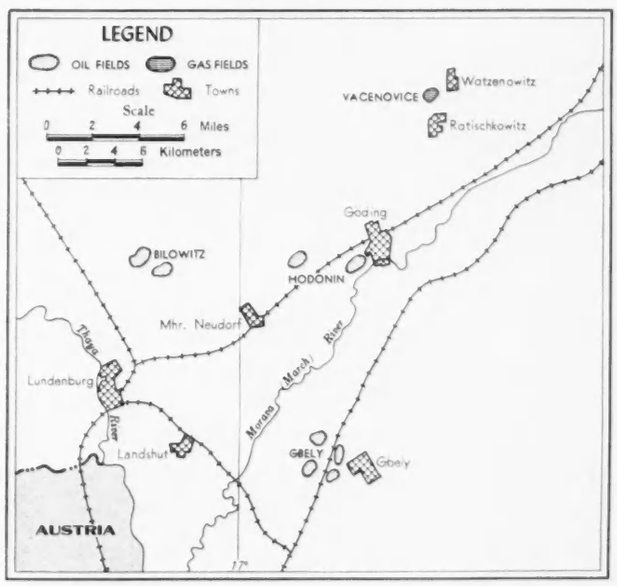
The Gbley field produces small amounts of oil from shallow Miocene formations. It was first discovered in 1913 and production is somewhat spotty on a structure which is badly faulted. Average depths of wells is around 550 to 800 feet. Hodonin field is a group of very small producing areas north of Gbley and near the town of Hodonin and structural features are quite similar. Recently there has been some new oil reported on the March River southwest of Hodonin, but there have been no estimates of its potentialities other than it will probably be small.

Wildcatting has been carried out in various parts of Western Slovakia for the past two years without further result.

During 1946 and 1947, Czechoslovakia's imports have been coming principally from Russia, Roumania, Austria and Hungary, but at the end of 1947 it became apparent that enough crude for local needs would not be forthcoming and the country would have to turn to Western Europe in an attempt to supply its needs. In 1947, when demand was a minimum of 3,200,000 barrels a year, only 2½ million barrels were delivered from Eastern Europe.

Recently it is reported that a gas line has been completed from the Stalin synthetic oil plant at Zaluzi to Prague and the industrial districts of northwest and central Bohemia. The gas to be transported is a by-product of the synthetic fuel being produced from soft coal at the Stalin plant.

Moravia Area

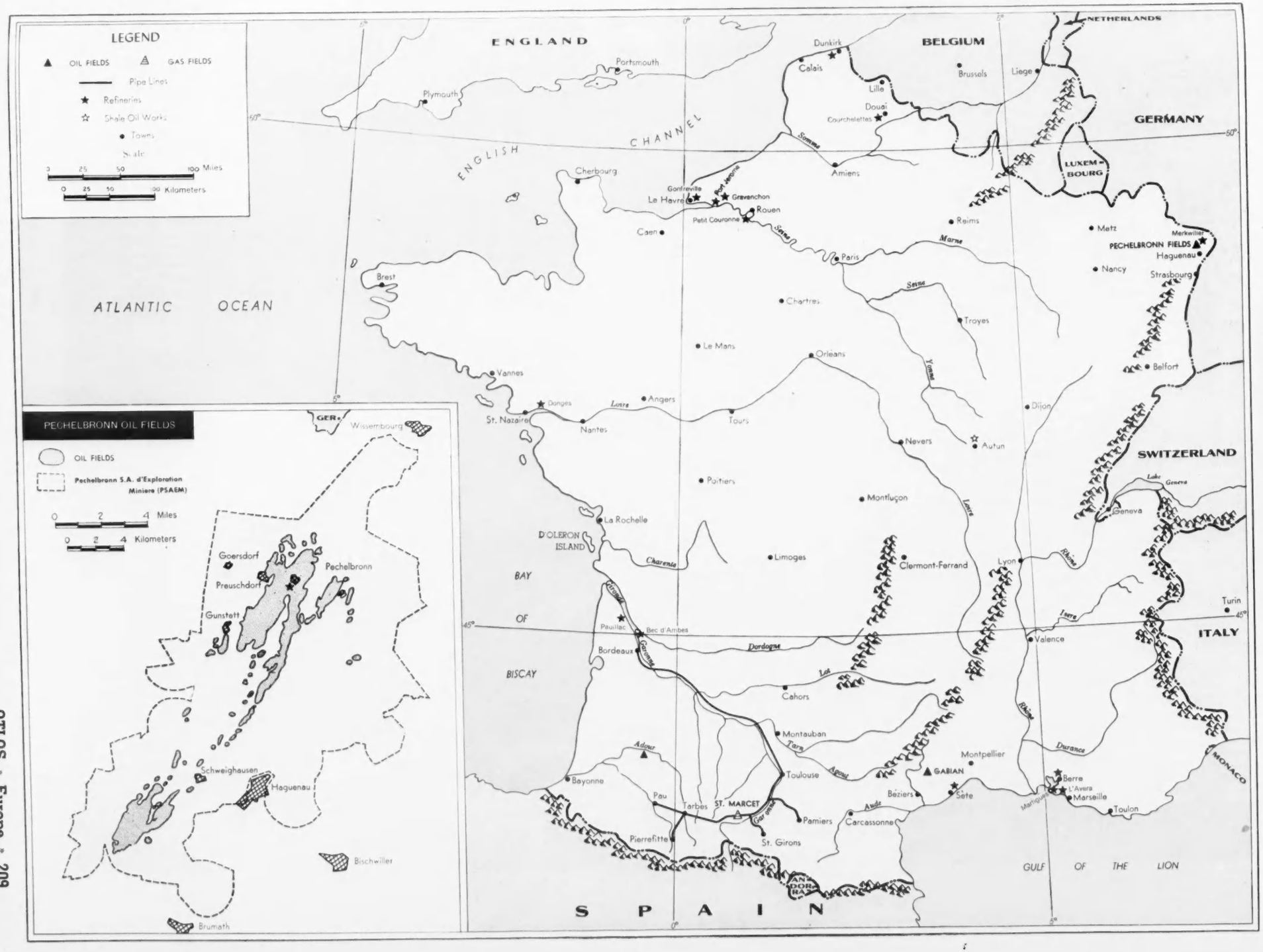


The Sign the World Knows—

82 Years of Leadership in a Progressive Industry—PETROLEUM

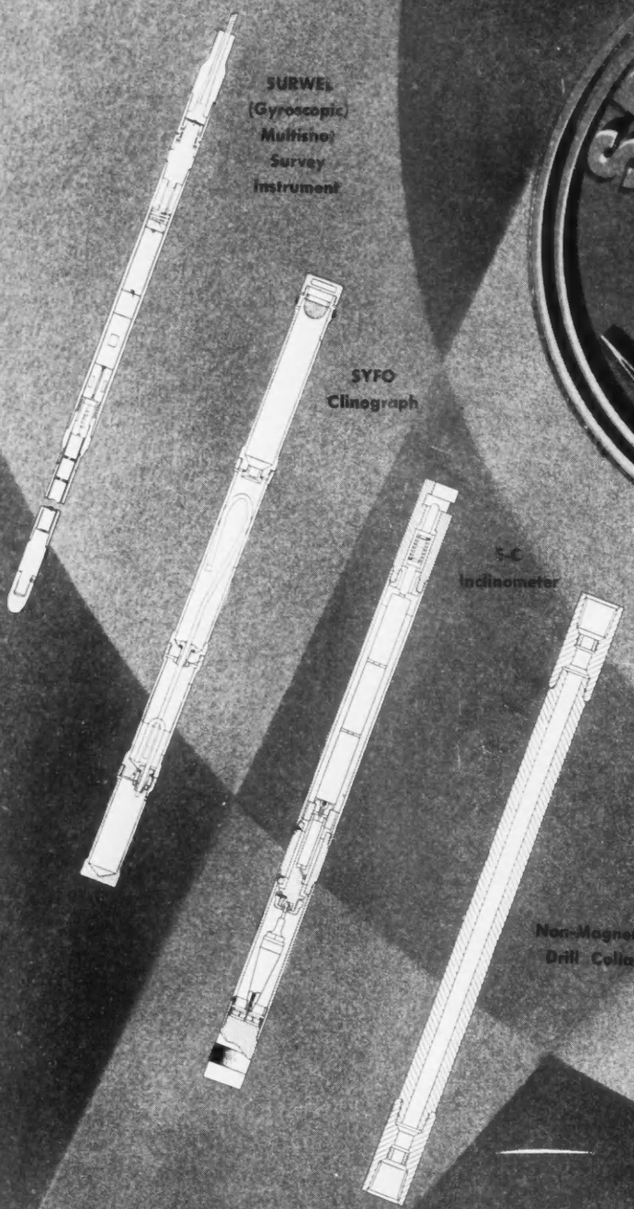
SOCONY-VACUUM

Socony-Vacuum Oil Co., Inc. and Affiliates: Magnolia Petroleum Co. General Petroleum Corporation



FRANCE—Pechelbronn Fields

Symbol of Progressive Leadership in the Science of Well Surveying



Sperry-Sun not only pioneered the science of oil well surveying, but through progressive development of techniques and instruments, has enjoyed consistent leadership in this important field of service to the oil industry.

All of the benefits accruing from original and continuous research, and the broad technical experience gained from more than 18 years in the field, is incorporated in each Sperry-Sun instrument which is designed to provide the maximum in accuracy and service at low cost.

Your nearest Sperry-Sun Service Engineer is available at all times to help you with your well surveying problems.

★SURWEL SERVICE ★SYFO CLINOGRAPH ★E-C INCLINOMETER ★NON-MAGNETIC DRILL COLLAR

SPERRY-SUN

SPERRY-SUN WELL SURVEYING COMPANY

3118 BLODGETT AVENUE HOUSTON, TEXAS

Philadelphia, Pa. Fairfurrias, Texas Odessa, Texas Marshall, Texas Long Beach, Calif.
Oklahoma City, Okla. Lafayette, La. Bakersfield, Calif.
Moulden Oil Field Services, Casper, Wyo.

DENMARK

THE first deep wildcat in Denmark's exploration program was completed on December 24, 1947, and preparations were under way early in 1948 for starting the second well.

Danish American Prospecting Company, a subsidiary of Gulf Oil Corporation, has been active in Denmark since 1938 when geological and geophysical work was started for the purpose of finding structures for subsequent drilling. A considerable amount of work has been done at the time Denmark was overrun by the Germans, and since the close of the war the company has resumed operations. The company's Vinding 1, located near Holstebro in west central Jutland was spudded in July, 1947, and drilled to 7985 feet before being abandoned with drill stem stuck at that point.

At the close of the year the rig was being moved to location for Gassum 1, about 26 miles northwest of the town of Aarhus and some 80 miles northeasterly from the recently abandoned Vinding 1.

Shallow drilling by Danish American Prospecting Company was continued throughout the year, using portable rigs, and as a result a number of salt domes indicated by previous geophysical work were actually confirmed, and rock salt has been reached by the drill on Vejrum, Suldrup and Hornum domes, all in northern Jutland, in the region in which the deep wildcat and present test are situated.

During the year a gravity party and a refraction seismograph party have been in continuous operation, and the company will likely continue the system of checking geophysical work with core drilling. A sizeable geological organization is being maintained in Denmark, including a stratigraphic laboratory. The concession under which the company operates covers the entire country.

Any petroleum in commercial quantities found in Denmark would be of extreme economic importance to the nation which now is dependent entirely on imports for its requirements. Most of its imports are in the form of finished products, since there is only one refinery, a small plant at Kalundborg, near Copenhagen, capable of handling only 400 barrels daily in a topping operation.

FRANCE

FRANCE, whose indigenous crude oil production is insignificant in comparison with its consumption, is making a well organized effort to develop new sources of oil within its own borders, and it is thought that, with acquisition of new heavy drilling equipment which became available during 1947, the program of exploratory drilling will be well advanced by the end of 1948.

Production of crude during 1947 amounted to 205,958 barrels, most of which came from the Pechelbronn area. This is compared with a 1946 production of 233,244 barrels. Continued exploration and development drilling by Régie Autonome des Pétroles on its concession in the southern part of France, has failed to find new oil production other than the single well in the St. Marcet field which produced 3940 barrels during 1947, but gas production has been increased until it is felt that it is becoming of definite economic importance to the nation. There are now 8 gas wells producing more than five billion cubic feet during the year, about half of which is processed through the company's gasoline plant at Peyrouzet for recovery products before going into a rapidly expanding pipe line system for domestic and industrial use. More than 100 miles of new gas pipe line were built during 1947, and gas is now being delivered as far as Toulouse. Eight rotary rigs are in operation on the R.A.P. concession, one of which drilled a wildcat to 13,259 feet to establish a new European depth record.

In the southern France concession held by the Société Nationale des Pétroles D'Aquitaine, a small discovery was registered just before the end of the year. The company's Audignon well at Landes drilled to 7260 feet, finding showings in a 50-foot limestone section in the Triassic from which a small amount of oil was being produced during production tests prior to acidizing. The company was running four rigs

Engineering and Geological Data on France Fields

Department and Field	Proved Area (Acres)	Range of Gravity Oil A.P.I.	Name	Kind	Age	DEPTH (Ft.) Minimum to Top of Pay	DEPTH (Ft.) Maximum to Bottom of Pay	Avge. Thickness of Pay (Ft.)	Type of Structure
Landes:									
Audignon	Unknown	22.3		Limestone	Jurassic	7130	7180	50	Anticline
Haute Garonne:									
St. Marcet Field:									
Oil		45		Dolomite	Jurassic	6000	6140		Anticline
Gas		Gas		Conglomerate	Cenomarian	4000	6000	500	Anticline
Gas	1700	Gas		Dolomite	Jurassic	5100	6250	....	Anticline
Herault:									
Gabian	17	34	Muschelkalk	Dolomite	Lower Triassic	205	1200	30	Faulted Anticline
Bas-Rhin:									
Pechelbronn	7660	27	U. Pechelbronn	Sand	Oligocene	660	990		
			L. Pechelbronn	Sand	Oligocene	660	1155		
				Dolomite	Oligocene	825	1650		Anticline
				Sand	Jurassic	1320	2310		
				Sand	Triassic	2970	3960		

Oil Production and Producing Oil Wells in France

Department and Field	Operating Company	Year of Discovery	PRODUCING OIL WELLS END OF 1947 Flowing	Art. Lift	Total Producing	CRUDE OIL PRODUCTION (Barrels) Daily at End of 1947	Year 1946	Year 1947	Cumulative Through 1947
Bas-Rhin:									
Pechelbronn	Pechelbronn Anonyme d'Exploitations Minieres	1735	....	691	691	560	231,294	200,938	13,426,665
Haute Garonne:									
St. Marcet Field:									
Oil	Régie Autònome des Pétroles	1939	1	0	1	13	936	3,940	22,784
Gas			8	0	8	19*	3,880*	5,190*	18,160*†
Herault:									
Gabian	Société Nationale des Pétroles du Languedoc Mediterranéen	1924	....	5	5	3	1,014	1,080	187,330
	Total	....	9	696	705	576	233,244	205,958	13,636,779

* Gas production in millions of cubic feet. † Including 89,000,000 cu. ft. from oil producing well.

Marmon-Herrington All-Wheel-Drive

Big Name in the Oil Fields

Tractive power—lots of it—*in every wheel*—that's what you need in your oil-field trucks . . . and that's exactly what you get in Marmon-Herrington *All-Wheel-Drives.*

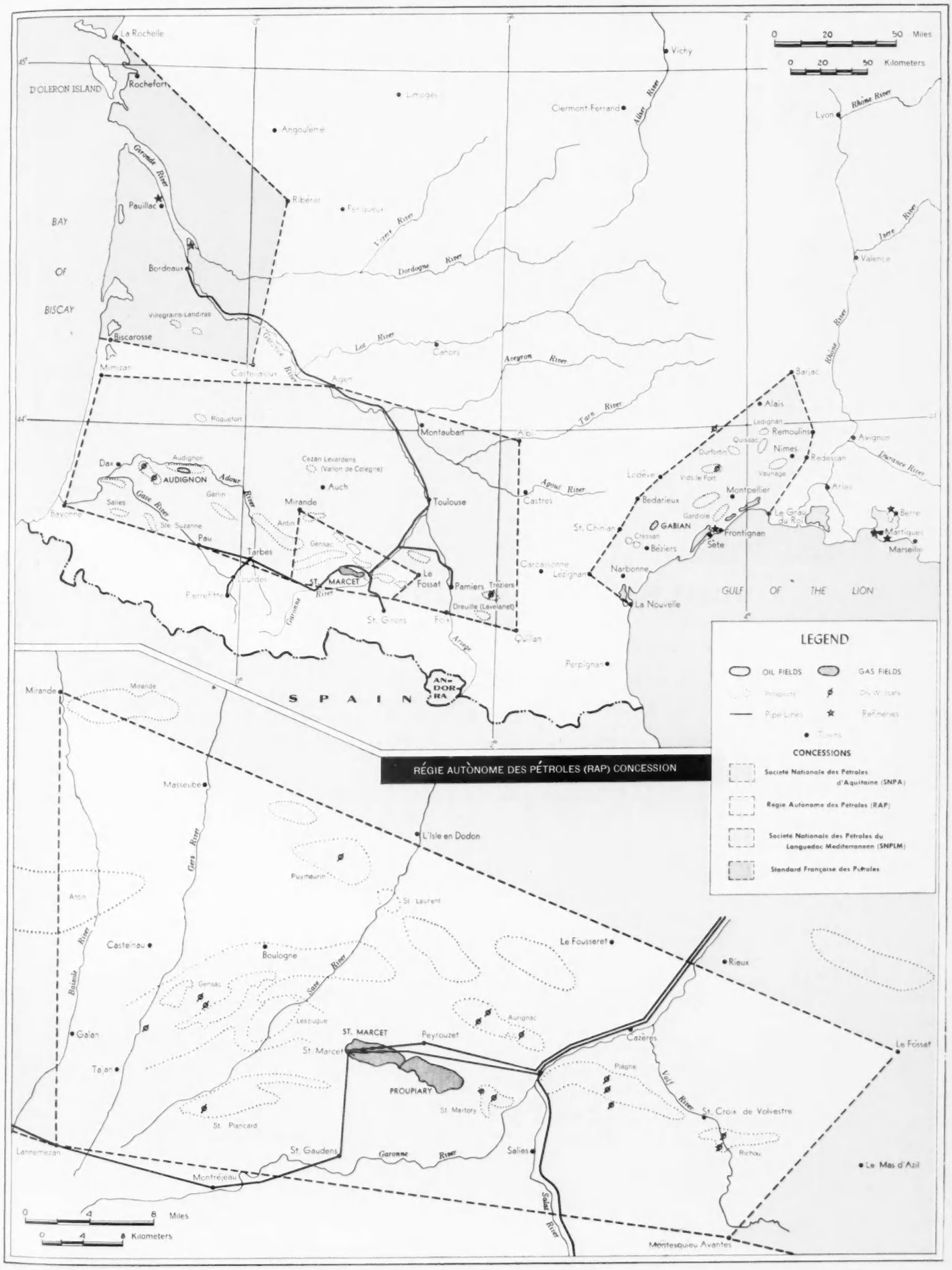
Marmon-Herrington *All-Wheel-Drive* Trucks have the kind of tractive power that transports peak payloads—*where you want them, when you want them*—regardless of weather or terrain. With these great trucks on the job there's no worrying about deep mud, sand or snow, steep hills or mountain grades—Marmon-Herrington *All-Wheel-Drive* takes them all in swift, sure-footed stride.

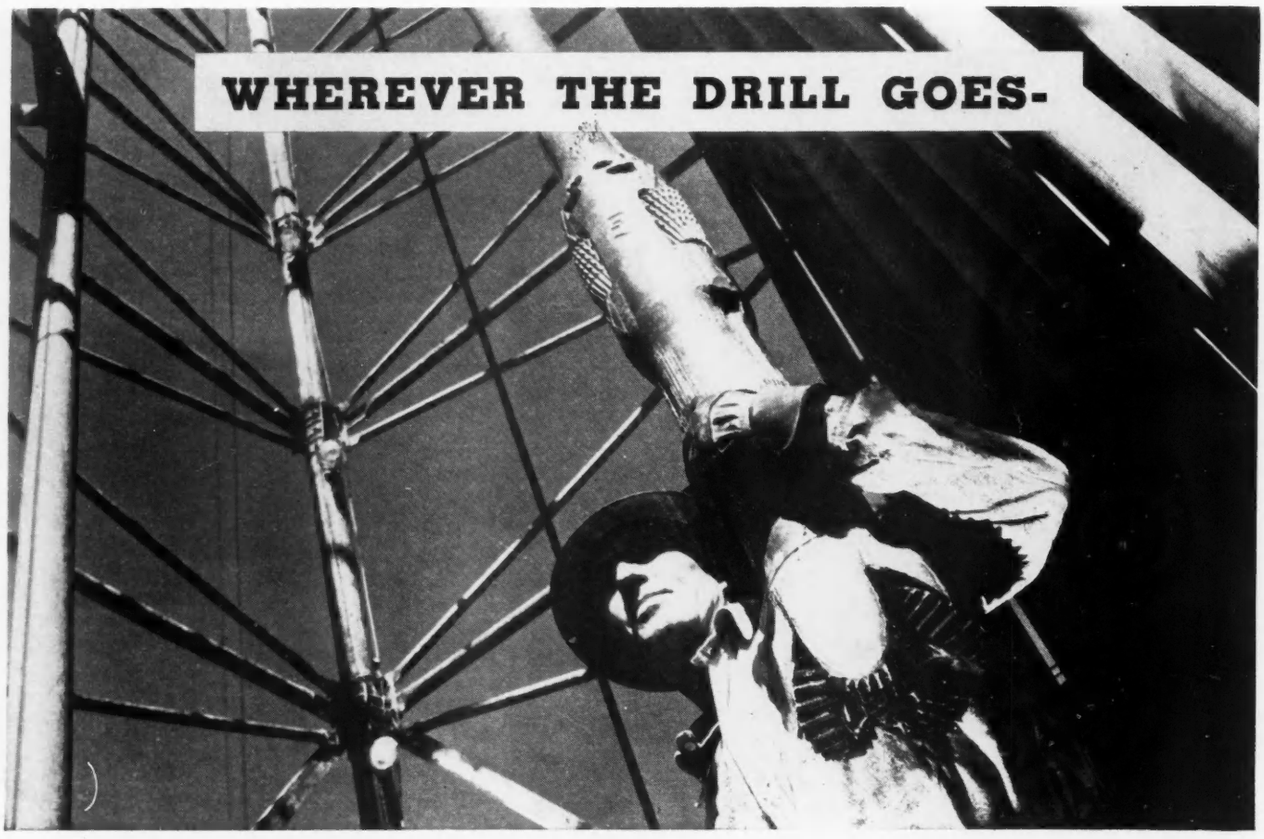
Marmon-Herrington *All-Wheel-Drive* Trucks are made in a wide range of wheelbases and capacities—regular Heavy-Duty models (4-wheel-drive and 6-wheel-drive) have gross vehicle weights up to 42,000 pounds—*All-Wheel-Drive* converted Fords (in all standard models) have gross vehicle weights ranging from 4,700 pounds to 35,000 pounds.

Let your Marmon-Herrington dealer give you an on-the-job demonstration of *All-Wheel-Drive.* You'll witness performance-ability you never thought possible in motor trucks.

MARMON-HERRINGTON COMPANY, INC., INDIANAPOLIS 7, INDIANA

FRANCE—Southern Fields and Concessions





SCHLUMBERGER IS READY TO GO

Wherever your operations may be, this closely-knit world-wide service organization is ready to provide the high standard of service that has distinguished Schlumberger.

SCHLUMBERGER SURENCO, S. A.

APARTADO 1608—CARACAS, VENEZUELA—CABLE: SURENCO CARACAS

OPERATING CENTERS:

EL TIGRE, ANZOATEGUI, VENEZUELA
JUSEPIN, MONAGAS, VENEZUELA
QUIRIQUIRE, MONAGAS, VENEZUELA
TEMBLADOR, MONAGAS, VENEZUELA
LAS MERCEDES, GUARICO, VENEZUELA
MARACAIBO, ZULIA, VENEZUELA
LAS MOROCHAS, ZULIA, VENEZUELA
SAN FERNANDO, TRINIDAD, B.W.I.
MEXICO CITY
SAO SALVADOR, BAHIA, BRAZIL
SALINAS, ANCON, ECUADOR
SHELL-MERA, ECUADOR

SCHLUMBERGER OF LATIN AMERICA, S. A.

APARTADO 1608—CARACAS, VENEZUELA. CABLE: SCHLUMBERGER CARACAS

OPERATING CENTERS:

BOGOTA, COLOMBIA
BARCO CONCESSIONS, COLOMBIA
CASABE, BARRANCA, COLOMBIA
BARRANQUILLA, COLOMBIA
EL DIFICIL, COLOMBIA
TALARA, PERU

COMPANIA DE INVESTIGACIONES GEOFISICAS SCHLUMBERGER, S.A.

AVENIDA R.S. PENA 832—BUENOS AIRES, ARGENTINA. CABLE: SCHLUMBERGER BUENOS AIRES

OPERATING CENTERS:

COMODORO RIVADAVIA (CHUBUT), ARGENTINA
PUNTA ARENAS, CHILE

SCHLUMBERGER OVERSEAS, S. A.

ADMINISTRATIVE OFFICE—P. O. BOX 25—SAN FERNANDO, TRINIDAD, B.W.I. CABLE: SCHLUMBERGER SAN FERNANDO

OPERATING CENTERS:

SERIA, BRITISH BORNEO
TARAKAN, BORNEO, N.E.I.
BALIKPAPAN, BORNEO, N.E.I.
TALANG AKAR, SUMATRA, N.E.I.
TALANG DJIMAR, SUMATRA, N.E.I.
SORONG, NEW GUINEA, N.E.I.
CHAUK, BURMA
TRIPOLI, LEBANON
RAS MATARME, EGYPT
RAS GHARIB, EGYPT
BASRA, IRAQ
KUWAIT, PERSIAN GULF
QATAR, PERSIAN GULF

SCHLUMBERGER ASIATIC, INC.

ADMINISTRATIVE OFFICE—P. O. BOX 25—SAN FERNANDO, TRINIDAD, B.W.I. CABLE: SCHLUMBERGER SAN FERNANDO

OPERATING CENTERS:

DIGBOI, ASSAM, INDIA
KHAUR, PUNJAB, PAKISTAN

SOCIETE DE PROSPECTION ELECTRIQUE

42 RUE SAINT DOMINIQUE—PARIS 7, FRANCE. CABLE: PROSELEC PARIS

OPERATING CENTERS:

EUROPE FRENCH UNION

THE ABOVE COMPANIES HAVE AN OFFICE IN THE UNITED STATES:

ADDRESS: P. O. BOX 2173—HOUSTON, TEXAS. CABLE: MENIL HOUSTON

at the beginning and six rigs at the end of the year. The concession covers 7 million acres and contains many structures found by geological and geophysical means, and which are being drilled as rapidly as possible.

Since the beginning of 1948 it has been reported that the Société Nationale des Pétroles du Languedoc Méditerranéen, operator of the third southern France concession, has found oil in one of its wildcats near Béziers and about 25 miles from the old Gabian field. The formation is reported to be the same as that from which the Gabian field produces and at a depth just above 2400 feet. It was scheduled for production tests early in the year. The company is operating 10 rigs on its 2-million acre concession, five of which are heavy rotary rigs, and here again a number of structures have been outlined during the period of material shortages which will now be drilled. Gabian Field, located in this concession, has had about 50 shallow wells drilled between 1924 and 1930 but total production has only amounted to 187,330 barrels of paraffin oil over the life of the field.

The Pechelbronn field, in northeast France, has been producing oil since as far back as 1735, early production coming from hand-dug wells, and later by mining methods from sumps and galleries and from drilled wells. After interruption of activities during the war the area has never regained its former volume, and 1947 production amounted to only 200,938 barrels. The 691 wells in the field are now producing only 560 barrels daily, or less than a barrel daily per well. Production from galleries is estimated at about 145,000 barrels yearly.

France's refining capacity, badly damaged during the war, has gradually been rebuilt and replaced until it now stands at 110,400 barrels daily for 14 plants capable of complete or partial operation. This is steadily being increased.

Refineries of France

COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity Bbls. Daily)	Daily Crude Runs End of 1947 (Bbls.)	Type of Refinery	Operating Status
Compagnie Française de Raffinage	Gonfreville (Le Havre)	25,000	13,400	18,000	Skimming, wax	Enlarging and Operating
	Martigues (Marseille)	23,000	11,500	20,000	Skimming-cracking, asphalt	Operating
Les Consommateurs de Pétrole	Donges (St.-Nazaire)	3,000	None	1,500	Skimming, lubes	Operating
Compagnie Industrielle des Pétroles	Frontignan (Sète)	1,500	.....	1,400	Lube	Damaged
Pechelbronn S. A. Exploitations Minieres	Merkwiller (Strasbourg)	1,500	250	1,000	Skim, lube, asphalt	Badly damaged
Pechelbronn Ouest.	Donges (St.-Nazaire)	4,000	.....	.....	Skimming	Shut Down
Raffineries de la Vacuum Oil Co.	Gravenchon (Rouen)	7,500	3,000	5,500	Skimming	Operating
Ste. Generale des Huiles de Pétrole 21	L'Avera (Marseille)	18,000	7,500	17,500	Skimming	Operating
	Courchelettes (Douai)	750	.....	.....	Lube wax	Damaged
	Dunkerque	26,000	6,000	.....	Skimming-cracking, asphalt	Proposed to replace ref. destroyed
Compagnie de Raffinage Shell-Berre	Petit-Couronne (Rouen)	19,000	6,500	15,000	Skimming, lube, asphalt	Operating
	Pauillac (Bordeaux)	3,000	.....	.....	Asphalt	Rebuilding
	Berre (Marseille)	13,000	2,000	10,500	Complete	Operating
Ste. des Raffineries de Pétrole de la Gironde	Bec d'Ambes (Bordeaux)	14,000	2,100	.....	Skimming	Rebuilding
Standard Française des Pétroles S. A.	Port Jerome (Le Havre)	25,000	5,000	20,000	Skimming, lube	Operating

Natural Gas Pipe Lines of France

Company	Origin	Terminus	Length Miles	Diameter (Ins.)	Capacity (Thousand Cu. Ft./ Day	Year Completed	Status
* R.A.P.	St. Marcet field	Peyrouzet	3	8″	24,700	1942	In use
	St. Marcet field	Boussens	10	9½″	70,700	1947	In use
	Peyrouzet	Pau via Tarbes	75	5″	8,500	1946	In use
	Tarbes	Pierrefitte	22	4″	2,000	1946	In use
	Boussens	Toulouse	37	12½″	42,500	1947	In use
	Peyrouzet	Toulouse	46	6″	14,000	1942	In use
	Capens	Pamiers	34	5″	3,500	1947	In use
	Boussens	St. Girons	22	4″	6,350	1946	In use
	Toulouse	Bordeaux	155	8″	12,000	....	Building
Total.	.....	.....	404	.....	184,250	.....	.....

* Régie Autònome des Pétroles.

Wildcats in France in 1947

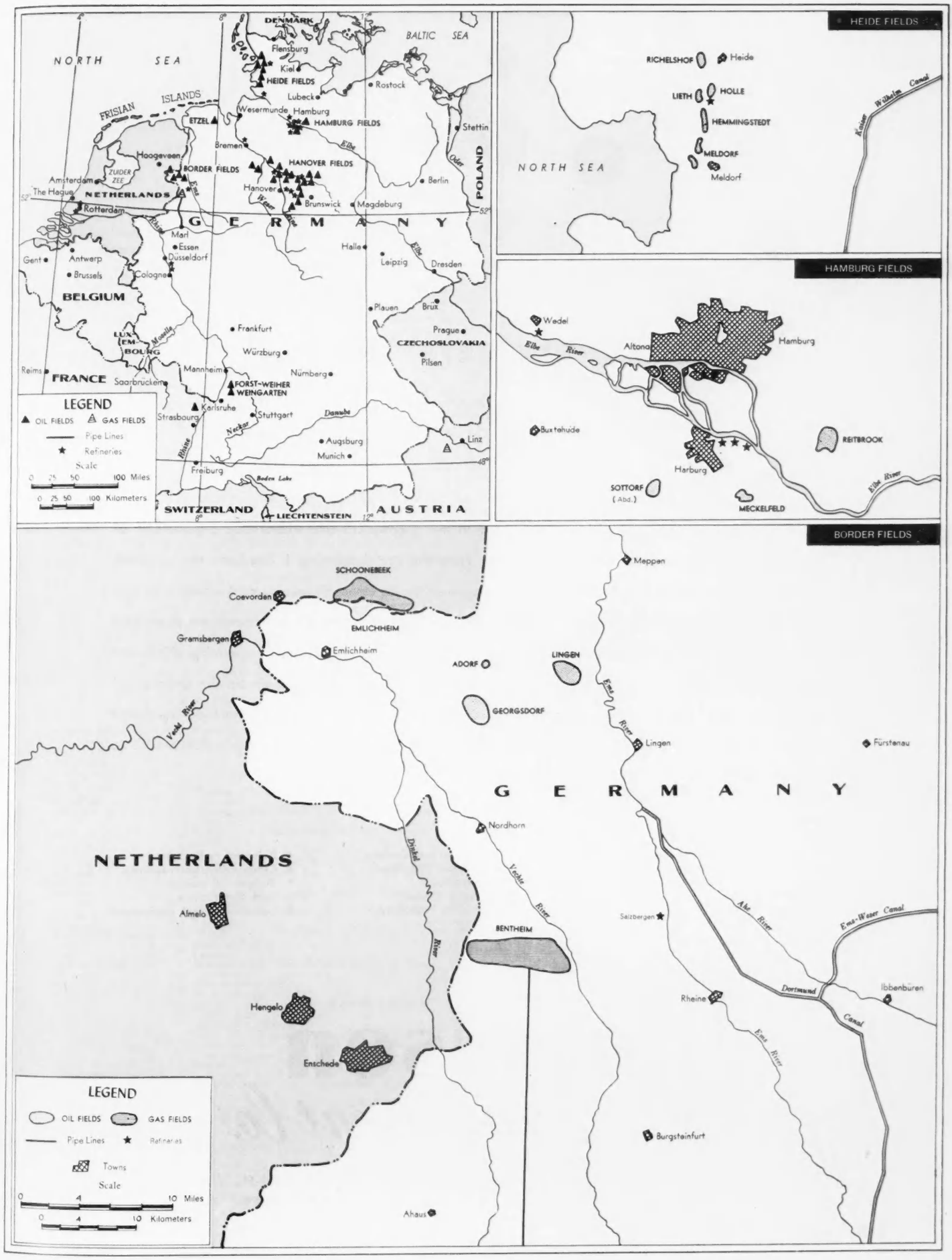
Department	Company, Well, Location	Date Completed	Total Depth (Ft.)	Results
Ariege:				
	R.A.P. Richou 1, 25 miles East-Northeast of St. Gaudens	Feb.	7957	Dry
Aude Lagarde:	S.N.P.A.—Well T 2, 17 miles East of Pamiers (Ariege)	Mar.	5450	Dry, primary granite
Bas-Rhin:				
Pechelbronn	Pechelbronn S. A. E. M.—East border of the concession:			
	Soufflenheim— 4	April	2264	Dry
	12	April	1140	Dry
	14	June	3343	Small trace of oil
	15	Nov.	1770	Dry
Haute Garonne:				
	R. A. P.—Saint-Martory 2, 10 miles East-Northeast of St. Gaudens	Jan.	8124	Dry
	R.A.P.—Aurignac 2, 12 miles Northeast of St. Gaudens	Feb.	7933	Salt water
	R. A.P.—Puymaurin 1, 20 miles North of St. Gaudens	Nov.	13259	Test salt water, little gas
Haute Pyrenees:				
Lapeyre	S. N. P. A.—Well AT 1, 19 miles North of Tarbes (Hautes-Pyrenees)	Jan.	8546	Dry, Triassic
Landes:				
Bancs	S. N. P. A.—Well A 1, 21 miles East from DAX (Landes)	Nov.	7259	Discovery, 3 bbls. per day, tests continued on productive formation, Jurassic limestone

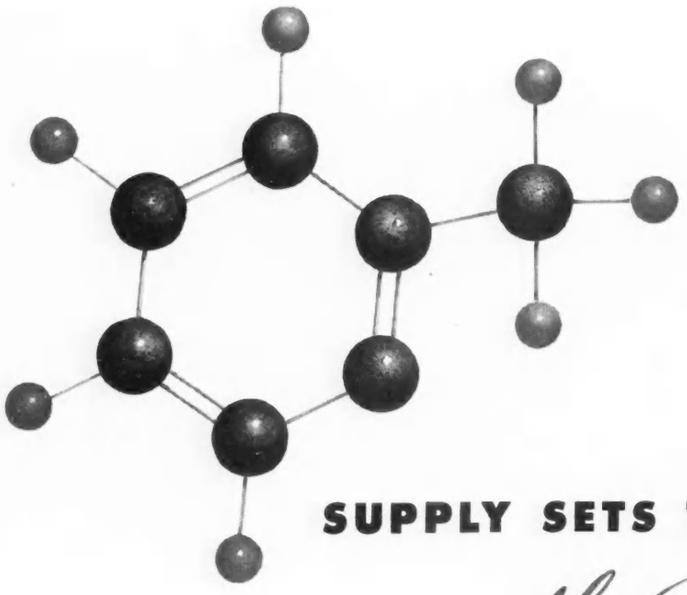
Drilling in France

Department and Field	WELLS COMPLETED IN 1946					WELLS COMPLETED IN 1947					WELLS DRILLING AND SHUT DOWN AT END of 1947		
	Oil	Gas	Dry	Total Wells	Total Footage	Oil	Gas	Dry	Total Wells	Total Footage	Drlg.	SD	Total
Aquitaine Basin:													
Wildcats			4	4	16,610	1		2	3	21,255	3	1	4
Ariege:													
Wildcats								1	1	7,957			
Bas-Rhin:													
Pechelbronn	21		10	31	60,436	22		23	45	69,843	20		20
Haute Garonne:													
St. Marcet	2	9	3	14	90,760		2		2	16,169	3		3
Wildcats		1	2	3	21,308			3	3	29,316			
Herault:													
Wildcats			2	2	1,956						8	2	10
Total	23	10	21	54	191,070	23	2	29	54	144,540	34	3	37

36-L KENTUCKY
28-L INDIANA
24-L NEW YORK
36-L MICHIGAN
IN FIELD AFTER FIELD
. . . Bucyrus-Erie Spudders are making money for owners on drilling and servicing jobs!
BUCYRUS ERIE
SOUTH MILWAUKEE, WISCONSIN, U.S.A.
28-L W. VIRGINIA
24-L MONTANA
36-L OKLAHOMA
28-L PENNSYLVANIA
36-L KANSAS
48-L TEXAS
36-L ILLINOIS
48-L OHIO
See for Yourself!
In all principal oil fields of the United States there are Bucyrus-Erie Spudder distributors who can show you Bucyrus-Eries in action.

GERMANY and NETHERLANDS—Border, Hamburg and Heide Fields





SUPPLY SETS THE PACE IN

the Search for Oil...

HARRISON EQUIPMENT COMPANY was organized for the sole purpose of maintaining and supplying dependable equipment to the geophysical and exploration departments of major oil companies and independent operators. From the very beginning, it has been our policy to always maintain adequate stocks of electronic components for the research development laboratories and to follow these developments with strict attention all the way through until the instruments are developed and put into the field for service. We have always carried sufficient inventories of operating equipment such as geophysical cables, loading poles and all other supplies necessary to maintain the geophysical crews in the field. Our suppliers are only the most reputable manufacturers, putting Harrison Equipment Company in a position to offer you a continuous source of dependable supplies for exploration work . . . TO HELP SUPPLY SET THE PACE IN THE SEARCH FOR NEW OIL RESERVES.

- **AC Power Plants, diesel and gasoline**
- **DC Battery Chargers, gasoline**
- **Geophysical cables**
- **Loading poles**
- **Paper flagging**
- **Water Cans and Coolers**
- **Photographic Chemicals**
- **Dry Batteries**
- **Centrifugal Pumps**
- **Geophysical transformers**
- **Selected radio tubes**
- **Close tolerance resistors**
- **Midget DC relays**
- **A-N Connectors**
- **Laboratory test equipment**

Harrison Equipment Co.

MAIN OFFICES: 1422 SAN JACINTO, HOUSTON
BRANCHES: 6234 PEELER ST., DALLAS • 1124 E. 4TH ST., TULSA

GERMANY

GERMANY is showing evidence of an intensive effort to develop its indigenous petroleum resources to the fullest possible extent. During the year 1947 it has more than doubled its total drilling volume, an outstanding accomplishment in view of the difficulties under which it operates as a conquered nation divided into zones occupied by four separate conquering nations.

The step-up in drilling, particularly in wildcatting, failed to halt the decline in production brought about principally by the severe wartime drains on its oil sources, but it is thought that continued development in the Emsland may serve to boost production somewhat. Production during 1947 amounted to 4,029,308 barrels, a drop of more than a half million barrels from 1946, and more than 3⅓ million barrels less than the nation produced in 1940, its peak producing year. Two-thirds of the production from German fields is controlled by German privately owned firms, 21 percent is controlled by two foreign concerns (Shell Group and Socony Vacuum), while about 12 percent is controlled by State-owned firms.

Practically all of the production is in the British zone of occupation, with a negligible amount in the American zone. Development in the Emsland has been slowed somewhat by the lack of sufficient labor in that area.

One hundred and fourteen wells were completed during the year, of which 51 were producers (including 1 gas well) and 63 were dry holes. The total of dry holes was materially increased by 27 dry wildcats out of 28 wildcats drilled. The greater part of the field development was in the salt dome areas of Hamburg and Hanover, where the nature of the structures makes for a high percentage of dry holes on steeply dipping flanks. However, continued drilling in this area has been carried on in an effort to offset the declines in such fields as Reitbrook, Heide and Neinhagen where war necessity forced withdrawals far above the maximum efficient produc-

Drilling in Germany

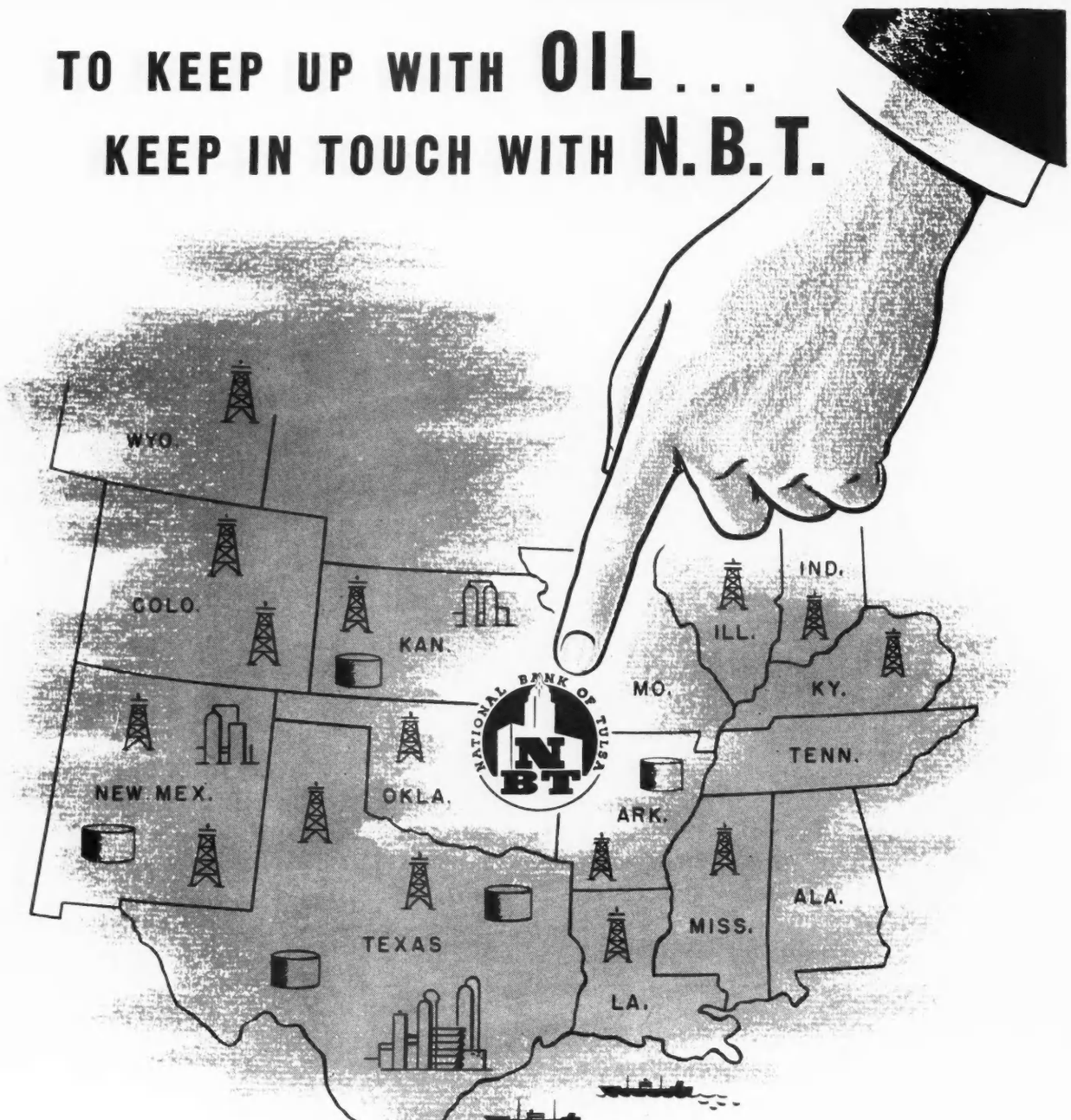
Regions and Fields	WELLS COMPLETED IN 1947					Wells Drilling and Shut Down at End of 1947		
				Total				
	Oil	Gas	Dry	Wells	Footage	Drlg.	SD	Total
Baden								
Forst-Weiher	3	..	2	5	11,277	1	..	1
Brunswick								
Wildcat	..	..	1	1	3,166	..	..	..
East Friesland								
Wildcat	..	..	1	1	3,684	..	..	..
Emsland								
Adorf	..	..	..	..	..	1	..	1
Emlichheim	4	..	1	5	14,456	1	1	2
Georgsdorf	9	..	..	9	20,765	4	..	4
Lingen	4	..	..	4	14,209	3	..	3
Wildcats	..	..	6	6	16,530	..	..	..
Hamburg								
Reitbrook	12	..	2	14	22,395	..	..	..
Wildcats	..	..	1	1	10,020	..	..	..
Hanover								
Broistedt	..	..	..	..	..	1	..	1
Calberlah	3	..	3	6	3,503	..	..	..
Etzel	..	..	..	..	..	1	..	1
Fuhrberg-Hambühren	11	..	3	14	20,601	2	..	2
Hademstorf	..	..	..	..	..	1	..	1
Hohenassel	2	1	2	5	9,698	2	..	2
Mölme	..	..	1	1	1,916	1	..	1
Nienhagen-Hanigsen	2	..	2	4	9,016	4	..	4
Oberg	..	..	..	..	..	..	1	1
Steimbke-Rodewald	5	..	1	6	11,768	..	..	..
Thören	..	..	1	1	4,200	1	..	1
Wesendorf	6	..	2	8	27,887	1	..	1
Wildcats	1	..	16	17	62,845	..	..	..
Schleswig-Holstein								
Heide	1	..	3	4	15,591	..	2	2
Wildcats	..	..	2	2	7,418	..	..	..
Total	63	1	50	114	290,945	24	4	28

Oil Production and Producing Wells in Germany

REGIONS AND FIELDS	Operating Company	Year of Discovery	Producing Oil Wells End of 1947			CRUDE OIL PRODUCTION (Barrels)			
			Flowing	Art. Lift	Total Producing	Daily at End of 1947	Year 1946	Year 1947	Cumulative Through 1947
Baden									
Forst-Weiher	Itag	1934	..	77	77	77	28,469	26,699	512,000
Weingarten	C. Deilmann	1936	..	72	72	41	18,958	14,182	234,000
Emsland									
Adorf	Preussag, (Gew. Elwerath, Wintershall & C. Deilmann)	1946	..	..	1*	nil	nil	nil	nil
Emlichheim	Wintershall A.G.	1944	..	12	12	1,262	168,685	363,608	596,000
Georgsdorf	Preussag, (Gew. Elwerath, Wintershall & C. Deilmann 25% each)	1944	5	25	30	696	104,175	169,021	359,000
Lingen	Schachtbau-& Tiefbohr-Ges.m.b.H. (Gew. Elwerath, 50%)	1942	1	25	26	703	284,678	265,042	836,000
Hamburg									
Meckelfeld	Wintershall A.G. (Gew. Elwerath, 50%)	1938	..	29	29	34	18,636	13,566	300,000
Reitbrook	Preussag and Deutsche Vacuum Oel A.G. (51:49%)	1937	48	55	103	692	239,678	241,895	7,850,000
Hanover									
Broistedt	Preussag and Gewerkschaft Elwerath (50-50%)	1937	..	7	7	49	17,811	20,014	150,000
Calberlah	Gewerschaft Elwerath	1945	..	6	6	7	3,895	2,762	7,700
Eddesse-Olheim	Preussag, Deutsche Erdoel A.G.	1876	..	18	18	48	21,077	18,482	1,610,000
Ehra	Deutsche Erdoel A.G.	1939	..	18	18	10	3,993	4,524	60,000
Eicklingen-Wienhausen	Wintershall A.G., Gewerkschaft Elwerath, Itag	1937	..	18	18	278	100,063	94,650	1,570,000
Eilte	Deutsche Vacuum Oel A.G.	1947	..	..	1†	nil	nil	600	600
Etzel	Preussag	1942	..	2	2	91	33,000	29,204	116,000
Fuhrberg-Hambuehren	Wintershall A.G., Gewerkschaft Brigitta, Itag, Hambuehren	1939 1941	..	176	176	826	357,230	296,762	2,320,000
Gifhorn	Deutsche Erdoel A.G.	1935	..	37	37	31	14,888	10,699	270,000
Hademsdorf	Deutsche Vacuum Oel A.G.	1941	..	4	4	119	46,881	39,748	230,000
Hohenassel	Gewerkschaft Elwerath (Preussag & Braunschweigische 33⅓% each)	1943	14	1	15	392	340,154	139,447	813,000
Mölme	Gewerkschaft Elwerath	1935	..	72	72	102	50,056	34,468	880,000
Nienhagen-Hanigsen	Gewerkschaft Elwerath, Wintershall A.G., Deutsche Vacuum Oel A.G., Itag, Ferdinand Koller & Sohn, Deutsche Erdoel A.G.	1899 1940	1	220	221	2,373	1,171,397	940,580	31,320,000
Oberg	Deutsche Vacuum Oel A.G., Itag, G. Greiser	1919	..	84	84	98	66,413	39,538	2,160,000
Steimbke-Rodewald	Gewerkschaft Brigitta	1936	2	140	142	797	322,951	290,028	2,680,000
Thören	Deutsche Erdoel A.G., (Gewerkschaft Brigitta & Vacuum)	1941	..	53	53	352	134,350	120,454	790,000
Wesendorf	Deutsche Erdoel A.G., Gew. Elwerath & Preussag	1943	20	1	21	885	319,622	311,790	1,265,000
Wietze	Deutsche Erdoel A.G.	1874	..	325	325	481	156,336	149,140	16,270,000
Schleswig-Holstein									
Heide, (Rickelshof, Lieth, Hemmingstedt & Meldorf)	Deutsche Erdoel A.G.	1935	..	50	50	1,022	520,027	392,405	8,100,000
	Total	....	91	1,527	1,618	11,466	4,543,423	4,029,308	81,299,300

* 1 shut-in well, not in total. † Non-commercial producer, not in total.

TO KEEP UP WITH OIL . . .
KEEP IN TOUCH WITH N.B.T.



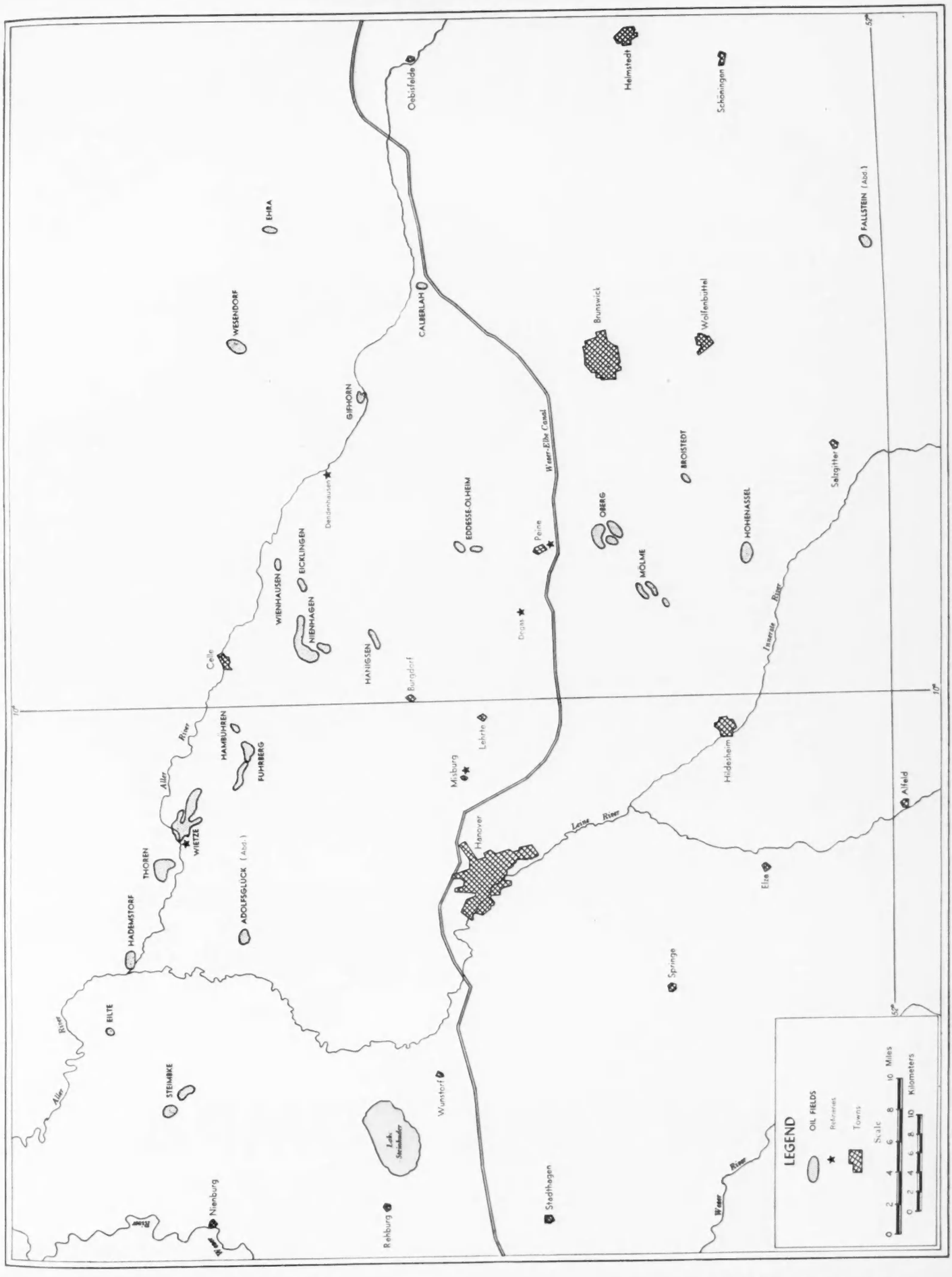
National Bank of Tulsa is in constant touch with developments in the oil industry throughout the Mid-Continent area. We have the practical oil industry knowledge, plus the resources, facilities and banking experience to intelligently help oil operators, contractors, equipment manufacturers and suppliers.

NATIONAL BANK OF TULSA

The Oil Bank of America

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

GERMANY—Hannover Fields



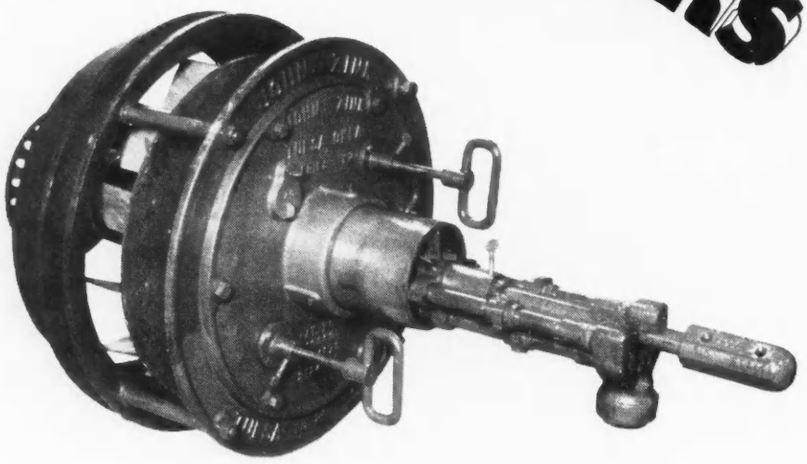
JOHN ZINK BURNERS

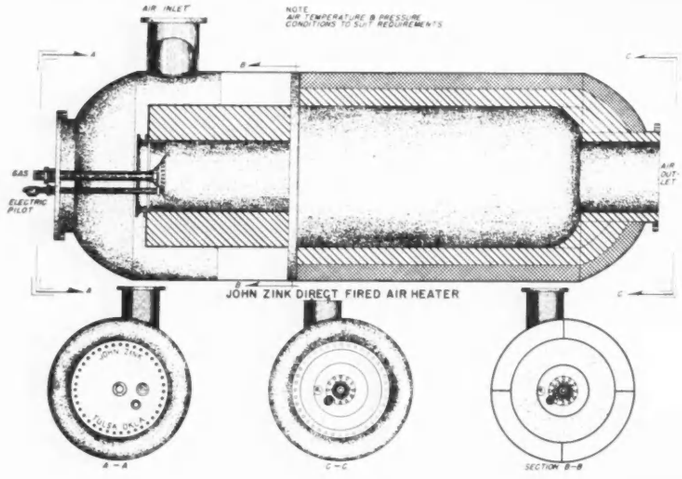
SERIES "Y" COMBINATION OIL and GAS BURNER

Fuel scarcity is no problem if you use John Zink Series Y Burners because this burner burns either, or both, gas and oil with the same heat pattern.

FEATURES

Independently removable fuel guns
Uninterrupted Burner Service
Easy to remove fuel guns—feather weight type, one man can remove for inspection and cleaning while the boiler remains in service.
Easy to operate
Simple in construction
No tile necessary—may be installed in circles turned in firebrick.





THE NEW DIRECT FIRED AIR HEATER

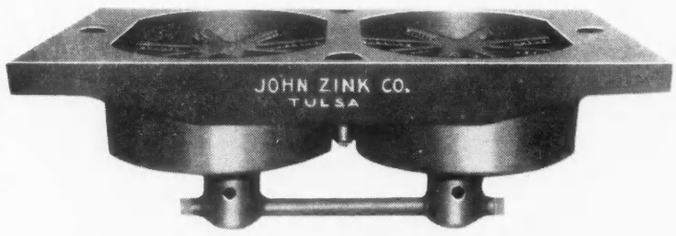
This special purpose burner can be used with Oil, Gas or a Combination of both fuels for delivery of hot air at atmospheric or higher pressures.

OUTPUT 1000 to 100 MILLION B.t.u./hr.
Available as a complete air heater or burner alone. It is really a TWO BURNER unit, a main duty burner and an independent everlasting pilot burner.

QUICK HEAT GENERATION
CLEAN BURNING
CONTINUOUS OPERATION

JOHN ZINK VERTICAL BI-MIX BURNER

Inexpensive to buy—easy to install. All in one piece—just brick into furnace wall.
Burns with a short flame, without the use of small ports, refinery gases, natural gas, oil vapors or a mixture of gases.
Slugs of water, oil or gasoline blow through them or run down over them without doing damage.
Can be used with high or low pressure gas.
Available for vertical or horizontal firing.



—Write for Literature—

JOHN ZINK COMPANY

4401 S. PEORIA **TULSA 1, OKLAHOMA**

New York • **Los Angeles** • **Salt Lake City** • **Houston**

GERMANY—Continued

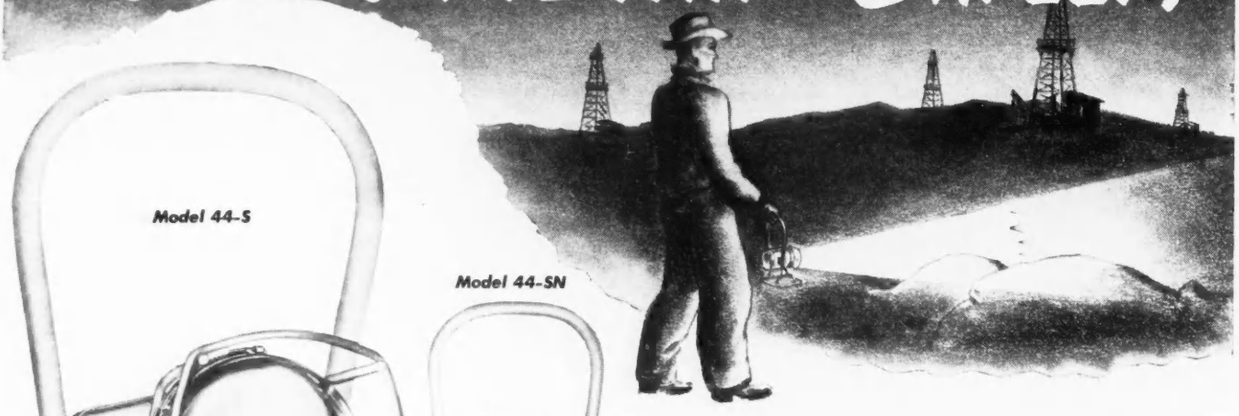
Wildcats Completed in Germany in 1947

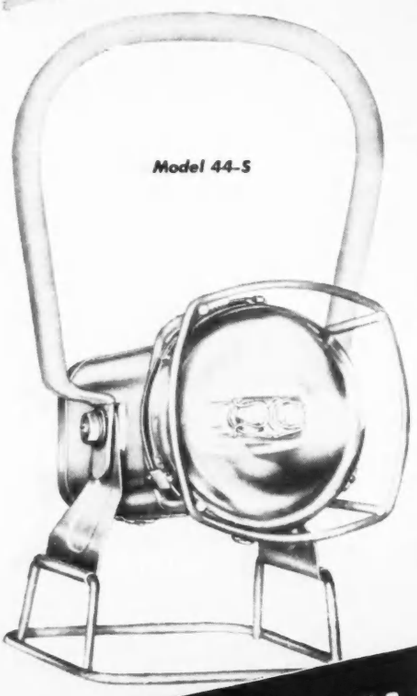
REGION COMPANY, WELL, LOCATION	Date Completed	Total Depth (Ft.)	Results, Formation
Emsland			
C. Deilmann Bergbau G.m.b.H., Itterbeck 2, 8 miles southwest of Georgsdorf field	10–7	2320	Tested 6 bbls. daily in Upper Muschelkalk. Shows also in Hauterive. Abandoned.
Deutsche Erdoel A.G. Menslage 1, 27 miles east of Lingen field	4–24	5689	Dry, Dogger (Jurassic)
Gewerkschaft Elwerath Lengerich 2, 14 miles east of Lingrn field	6–23	1627	Dry, Serpulit (Jurassic)
ITAG Lastrup 3, 18 miles northeast Lingen field	3–18	2835	Dry, Serpulit (Jurassic)
Schachtbau-& Tiefbohr A.G. Apeldorn, 1, 15 miles northeast Lingen field	8–2	1887	Dry, Malm (Jurassic) oil shows in the Wealden and Serpulit
Schachtbau-& Tiefbohr A.G. Duisenburg 1, 8 miles east Lingen field	7–10	2172	Dry, Malm (Jurassic)
Hanover			
Deutsche Erdoel A.G. Eitzendorf 3, 15 miles north west of Steimbke field	8–14	5600	Dry, Keuper (Triassic)
Deutsche Erdoel A.G. Hardesse 1, 7 miles west of Gifhorn field	3–12	6299	Junked, Dogger (Jurassic) oil shows in the Valendis, Wealden, Coral oolite and Dogger beta
Deutsche Erdoel A.G. Ostenholz 1, 6 miles north of Thören field	12–1	3898	Dry, Liassic (Jurassic)
Deutsche Vacuum Oel A.G. Ahrensheide 1, 6 miles northwest Hademstorf field	5–14	3100	Dry, Middle Keuper (Triassic)
Deutsche Vacuum Oel A.G. Ahrensheide 2, 6 miles northwest Hademstorf field	11–28	3835	Dry, Dogger (Jurassic)
Deutsche Vacuum Oel A.G. Eilte 4, 3 miles west Hademstorf field	8–5	4219	Small producer, Upper Wealden-Sand (Cretaceous)
Gewerkschaft Brigitta Esperke WA 15, 9 miles west of Wietze field	11–4	4583	Dry, Wealden (Cretaceous)
Gewerkschaft Elwerath Boitzenhagen 1, 4 miles northeast Ehra field	2–27	1690	Dry, Liassic (Jurassic)
Gewerkschaft Elwerath Oppershausen 2, 5 miles east of Celle	4–30	3471	Dry, Keuper (Triassic)
Gewerkschaft Elwerath Rautenberg 2, 2.5 miles northeast of Hildesheim	5–23	1224	Dry, Jurassic
Gewerkschaft Elwerath Scholen 3, 23 miles south of Bremen	9–4	3242	Dry, Liassic (Jurassic)
Gewerkschaft Elwerath Stemmerberg 2, 6 miles southwest Hanover	11–28	4360	Dry, Cornbrash Dogger (Jurassic)
Gewerkschaft Elwerath Wiswedel 5, 8 miles northeast Ehra field	8–22	3438	Dry, Dogger Beta (Jurassic)
Preussag Vordorf 3, 6 miles north Brunswick	11–8	2556	Dry, Upper Muschelkalk (Triassic) shows in Valendis
Wintershall A.G. Dueste, 5, 34 miles east Steimbke field	5–6	3120	Dry, Wealden (Cretaceous)
Wintershall A.G. Dueste 6, 36 miles east Steimbke field	12–1	2756	Dry, Wealden (Cretaceous)
Wintershall A.G. Wiag-Luttum 4, 18 miles northwest Steimbke field	4–29	5454	Dry, Liassic (Jurassic)
Schleswig-Holstein			
Deutsche Erdoel A.G. Holstein 146, 2 miles north Heide field	11–3	3166	Dry, Zechstein (Paleozoic) gas shows
Louis Ritz & Co. Peissen 4, 24 miles east Heide field	12–1	4252	Dry, Middle Zechstein (Paleozoic)
Brunswick			
Wintershall A.G. Flachstockheim 1, 11 miles southeast Hohenassel field	10–18	3166	Dry, Keuper (Triassic)
East Friesland			
Gewerkschaft Elwerath Barkholt 1, 18 miles northwest Etzel field	5–2	3684	Dry, Zechstein (Paleozoic)
Hamburg			
Preussag Reitbrook T 4, Reitbrook field deep exploration	8–11	10,020	Dry, gas shows Zechstein (Paleozoic)
Total ..... 28 Wells		103,663	

Engineering and Geological Data on German Fields

Region and Field	Proved Area (Acres)	Range of Gravity Oil (API)	Name	Kind	Age	DEPTH (Feet) Minimum to Top of Pay	DEPTH (Feet) Maximum to Bottom of Pay	Average Thickness of Pay (ft.)	Type of Structure
Baden									
Forst-Weiher									Tilted fault blocks
Weingarten	500	32–36	Meletta	Sand	M. Oligocene	800	1600	230–500	Tilted fault blocks
Emsland									
Adorf	120	31	Wealden	Shell beds	Lower Cretaceous	4050	4400	350	Anticline
Bentheim	2970		Platten-dolomite	Dolomite	Sechstein Permian	5130	5650	115	Anticline
Emlichheim		25	Bentheim sandstone (Valendis)	Sand	Cretaceous	2430	2890	89	Anticline
Georgsdorf	2500	24	Bentheim sandstone (Valendis)	Sand	Cretaceous	1600	3300	130	Anticline
Lingen		31–32.5	Valendis	Sand	Lower Cretaceous	2760	3870	460	Anticline
			Wealden Serpulite	Lime	Jurassic				
Hamburg									
Meckelfeld		24	Reitbrook beds	Lime	Upper Cretaceous	985	1380	65–100	Salt Dome
			Lower Cretaceous	Sandstone	Lower Cretaceous	1480	1670	40–65	
Reitbrook	850	21–23	Lower Eocene	Sand	Tertiary	1460	1635	20	Salt Dome
			Reitbrook beds	Lime	Upper Cretaceous	2100	2600	115	Salt Dome
Hanover									
Broistedt	25	33	Valendis	Sandstone	Lower Cretaceous	2400	3200	16–65	Salt Dome
Calberlah	1.2	19–22	Dogger	Sandstone	Jurassic	160	400	16–20	Salt Dome
Eddesse-Olheim	50	32	Rhaetic	Sandstone	Triassic	2800	3300	20–40	Salt Dome
Ehra	75	16.5	Lower Dogger	Sandstone	Jurassic	490	820	33	Salt Dome
Eicklingen-Wienhausen		33	Valendis Wealden	Sandstone	Lower Cretaceous	1670	3050	65	Salt Dome
Eilte		23	Wealden	Sand	Lower Cretaceous	3560	3700	55	Salt Dome
Etzel	75	13	Cap Rock	Lime Breccia	Jurassic	4560	4700	33	Salt Dome
Fuhrberg-Hambüren		23	Cornbrash (U. Doffer)	Sandstone	Jurassic	260	1930	115–130	Salt Dome
Gifhorn	60	17	Wealden	Sandstone	Cretaceous	660	820	100	Salt Dome
Hademstorf	75	25.5	Wealden	Sand	Cretaceous	4270	4440	25	Salt Dome
Hohenassel	50	30	Coral dolite	Lime-stone	Jurassic	1280	2070	130	Salt Dome
Mölme	100	32	Wealden Coral oolite	Sandstone, Limestone	Cretaceous, Jurassic	160	1800	30–100	Salt Dome
			Rhaetic	Sandstone	Triassic				
Nienhagen	4250	22.5	Valendis	Sand	Lower Cretaceous	600	5350	65	Salt Dome
		32.5	Wealden	Sandstone				30	
			Cornbrash	Lime-sandstone	Jurassic			65	
Nienhagen-Hänigsen	100	24.5	Valendis	Sand	Lower Cretaceous	2245	2770	82	Salt Dome
		28	Wealden	Sand					
Oberg	600	36.5	Wealden	Sand	Lower Cretaceous	520	1910	20	Salt Dome
		40	Lower Dogger	Sand	Jurassic				
Steimbke-Rodewald	200		Wealden	Sand	Lower Cretaceous	790	1030	65	Salt Dome
			Serpulite	Lime	Upper Jurassic	820	2400	20	
			Cornbrash	Sandstone	Middle Jurassic	950	2130	72	
Thören	125	19	Wealden	Sandstone	Cretaceous	1575	1720	165	Salt Dome
		34.5	Upper Dogger (Cornbrash)	Sandstone	Jurassic	2829	2990	130	
			Rhaetic	Sandstone	Triassic		4000	65	
Wesendorf	320	35.5	Lower Dogger	Sandstone	Jurassic	2630	3800	7–40	Salt Dome
			Liassic	Sandstone	Jurassic		6000	100	
Wietze	570	18	Senonian	Sandstone	Cretaceous	300	1000	30–65	Salt Dome
		27	Wealden	Sandstone	Cretaceous	300	1000	200	
			Upper Dogger	Sandstone	Jurassic	300	1000	200	
			Rhaetic	Sandstone	Triassic	590	1080	80–100	
Schleswig-Holstein									
Heide	1250	31	Basal breccia of the Lower Cretaceous	Sandstone	Cretaceous	2950	4500	30–130	Salt Dome
			Zechstein	Limestone	Palaeozoic	2590	3600	26	

LIGHTING THE WAY – SAFELY!





WITH JUSTRITE

ELECTRIC LAMPS AND LANTERNS FOR THE PETROLEUM INDUSTRY

MODEL 44-S. An all-purpose lantern that carries approval by the Underwriters' Laboratories, Bureau of Mines and Bureau of Marine Inspection and Navigation. Twin kick-out bulb sockets immediately eject broken bulbs and break the circuit. Lantern body of steel, movable handle. A fixed guard protects the globe while the base may be swung in any direction. Hung on wall or post, placed on the ground, or carried, this lantern gives a powerful flood-type beam wherever required. Selective switch throws current to either of two 5-volt Mazda lamps. Uses standard 6-volt battery. Stands 12 inches overall. Weighs (less battery) two pounds.

MODEL 44-SN. This lantern has the same outstanding features as the model 44-S, but is built entirely of brass, brightly polished. Completely non-sparking. Offers maximum resistance to corrosive effects of salt air and other vapors. Carries same "3-way" safety approvals.

MODEL 1955-S. New hand-size service flashlight. Also double approved for your safety. Compact plastic (one piece) case guaranteed against breakage in regular use. Three standard flashlight batteries, 1800 candlepower, long range with clear lens. Available with spread-beam honeycomb lens for "flood" light. Belt clip and carrying ring are attached to case. Angle of lens unit allows you to place light on level surface and get illumination where you need it.

MODEL 17-S. For maintenance work that requires two free hands—6-volt. Uses standard lantern battery. Battery case worn on strap and belt (supplied). Lens and bulb housing worn on head, wrist, knee or chest. Special bracket allows light to be focused in any direction. Clear or honeycomb lenses available and interchangeable.

JUSTRITE Safety Cans are the safe way to store and handle flammable liquids. Available in sizes from 1 pt. to 5 gals. Every can approved, numbered and labeled by Underwriters' Laboratories. Flexible Hose Attachment converts any Justrite Safety Can (of ½ gal. or larger capacity) into a flexible spout can—an added measure of safety and convenience.

These seals are proof of your security. Be sure the equipment you buy is really safe. Be sure it carries one or both of these seals.

Justrite products are available from your "oil-country" supply store.

JUSTRITE MANUFACTURING COMPANY

2048 Southport Avenue, Dept. G-7, Chicago, Illinois • Cable Address: "Justrite" Chicago

GERMANY—Continued

ing rates at which maximum recovery might be expected. Neinhagen field alone produced some 2½ million barrels yearly during the war, but has now declined to 940,580 barrels during 1947. Some of the decline may be attributed to bombing damage during the war. Only recently has reconstruction begun to assume its final stages. The Heide fields, which accounted for a substantial part of wartime production, was bombed heavily no less than 11 times during the final phases of the war, many parts of the field installations as well as refinery units suffering complete destruction. The refinery is now rebuilt to about half its pre-war capacity.

Natural gas is taking an important place in German industrial and domestic use with shortage of oil supplies and is being produced from 9 oil fields and from one gas field (Bentheim). Bentheim was producing nearly 7 million cubic feet daily at the end of the year, and the recovery from oil fields amounted to about a million cubic feet a day. Bentheim has two producing gas wells from which 11 billion cubic feet have been recovered.

An agreement was reached early in 1948 whereby German and Dutch interests will cooperate in development of the Emlichheim field which lies athwart the international boundary and which is assuming importance as a crude reserve. The areas along the border are to be developed with uniform spacing. A drilling derrick is not to be defined as a building, and therefore may be located within 164 feet of the boundary. Recent extensions have indicated the field may be the largest in Western Europe with additional development.

Most oil and product transportation is by rail or waterways, and only one crude oil pipe line is listed, a 5-mile combination 6- and 8-inch carrier from Reitbrook field to Warwisch on the Elbe River. A 48-mile natural gas line is in use from Bentheim gas field to Bunawerk Huels.

German Refineries

COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Type of Refinery	Operating Status
British Occupation Zone				
Deutsche Erdoel A.G.	Heide (Holstein)	2800	Skim	Operating
	Weitze (Hanover)	950	Skim, lubs, Asphalt	Operating
	Hamburg-Wilhelmsburg	2300*[2]	Skim, lubs, Wax	Damaged
Deutsche Gasolin A.G.	Dollbergen (Hanover)	2000	Skim, lubs, Asphalt	Operating
Deutsche Shell A.G.	Hamburg-Harburg	8400*[2]	Skim, lubs, Asphalt Wax	Rebuilding
	Monheim o/Rhine	1700	Skim, lubs, Asphalt	Operating
	Hamburg-Grasbrook	1300[1]	Lubs	Operating
	Duesseldorf-Reisholz	800[1]	Gasoline re-running	Operating
	Hamburg-Wilhelmsburg	470[1]	Rerunning	Operating
Deutsche Vacuum Oel A.G.	Bremen-Oslebs	2300 9500[2]	Skim, lubs, Wax	Operating
	Wedel o/Elbe (Holstein)	700[1]	Lubs, Wax	Operating
Ebano Asphalt-Werke A.G. (Standard Jersey)	Hamburg-Harburg	3500 17000[2]	Skim, lubs, Asphalt	Rebuilding
Europaeisch Tanklager & Transport A.G.	Hamburg-Finkenwarder	3500 5800*[2]	Skim, Cracking	Shut down
Gewerkschaft Deuragnerag.	Misburg near Hanover	7500	Complete	Operating
Johann Haltermann	Hamburg-Wilhelmsburg	1200[1]	Gasoline Re-running	Operating
Mineraloel-& Asphaltwerke A.G.	Ostermoor (Holstein)	1200 2400*[2]	Skim, Asphalt	Shut down
Mineraloelwerke Albrecht & Co. (Shell)	Hamburg-Grasbrook	230[1]	Lubs	Operating
Mineraloelwerke Peine	Peine (Hanover)	350	Skim, Lubs	Operating
Oelwerke Julius Schindler GmbH	Hamburg-Wilhelmsburg	400[1]	Lubs	Operating
Ernst Schliemann's Oelwerke	Hamburg-Grasbrook	470[1]	Lubs	Operating
Mineraloelwerke Albert Sengewald, Dedenhausen	Dedenhausen (Hanover)	230	Skim, Lubs	Shut down
Wintershall A.G.	Salzbergen (Emsland)	800 1200[2]	Complete	Operating
American Occupation Zone:				
Zeller & Gmelin, Eislingen o/Fils	Eislingen (Wuerttemberg)	150	Skim	Shut down

[1] Half-finished products charging capacity or half-finished products runs. [2] Capacity after rebuilding [3] 3300 bbls. cracking capacity. [4] 420 bbls. cracking capacity. *Rebuilding not yet approved.

GREAT BRITAIN

GREAT BRITAIN'S oil production of 349,700 barrels for 1947 showed a continuation of the steady decline in output since the peak year of 1943 when the nation produced 839,000 barrels. During that year the fields of Eakring and Duke's Wood, in the Midlands area, both attained their peak under the stress of wartime necessity, but discoveries have not kept pace. No new fields have been opened since 1943. Eakring and Duke's Wood produced 286,000 barrels, or nearly 82 percent of the total output for 1947. Recently the D'Arcy Exploration Company has started experimenting with secondary recovery at Eakring with plans for injecting gas at the crest of the structure and water on the flanks. Although this field has produced only a little more than a million barrels since 1939, it is now in the stripper stage, producing 240 barrels daily from 56 wells.

For the past several years, since the beginning of the war, the exploratory effort in Great Britain has been concentrated largely in the Midlands area, the site of most of the current producing areas, but operators are now returning their attention to other regions, principally the area of Mesozoic prospects in southern and southeastern England. A wildcat is now planned for the Portsdown area, overlooking Portsmouth harbor in the extreme south, where a wildcat drilled in 1937 was carried to 6556 feet, going through the

Engineering and Geological Data on Great Britain Fields

PROVINCE AND FIELD	Proved Area (Acres)	Range of Gravity Oil (A.P.I.)	Name	Kind	Geological Age	Depth (Ft.) Min. to Top of Pay	Depth (Ft.) Max. to Bottom of Pay	Avg. Thickness of Pay (Ft.)	Type of Structure
ENGLAND:									
Lancashire:									
Formby	....	37	Keuper Waterstones	Sand Shaley Clay	Triassic Triassic	80	250	20	Faulted Monocline
Nottinghamshire:									
Caunton	....	23.9-31.1	U. Grit M. Grit	Sandstone	Upper Carboniferous	2170	2300	12	Dome with faulting.
Duke's Wood	....	32.5-33.6	B. Sandstone Rough Rock Longshaw Grit Chatsworth Grit L. Carboniferous	Sandstone Limestone	Upper and Lower Carboniferous	1800 2500	2270 2640	20 70 20 60	Dome with faulting.
Eakring	....	34.4-37.6	B. Sandstone Rough Rock Longshaw Grit Chatsworth Grit Kinderscout Grit	Sandstone	Upper Carboniferous	1780	2260	10 60 20 100 40	Dome with faulting.
Kelham Hills	....	27.1-29.3	U. Grit L. Grit	Sandstone	Upper Carboniferous	2050	2280	40 30	Dome with faulting.

Grip-Tite ANCHORS

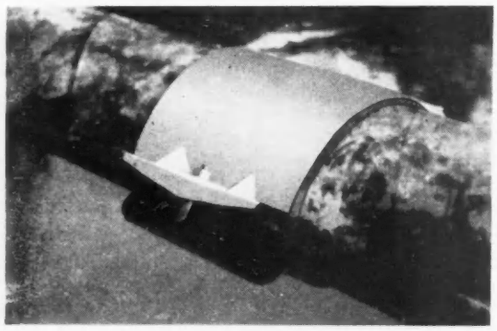
The Only Positive Expanding Anchor

"DEAD MEN THAT HOLD"

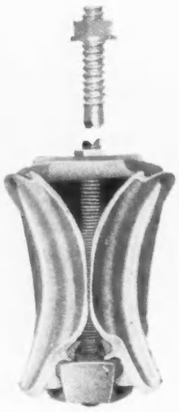
GRIP-TITE PIPE LINE ANCHOR ASSEMBLY

THE PICTURES TELL THE STORY

Grip-Tite Pipe Line Anchor Assembly with Stearns Pipe Saddle was originated and designed especially for protection to pipe coating and for permanent hold-downs for all kinds of pipe line construction, costing only a fraction of cast iron or concrete weights. It is field proved beyond any doubt. No heavy equipment is needed for installation—saves time, labor and other handling expense. Grip-Tite affords protection from heavy weight damage during installation. An expansion joint pad provides additional protection to pipe coating.

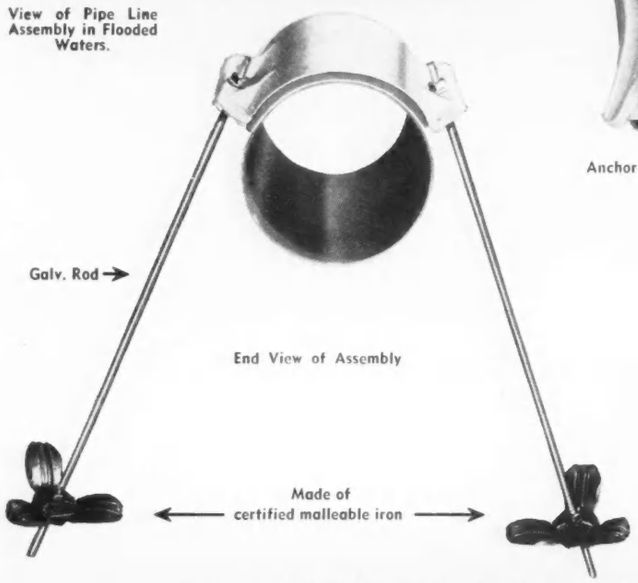


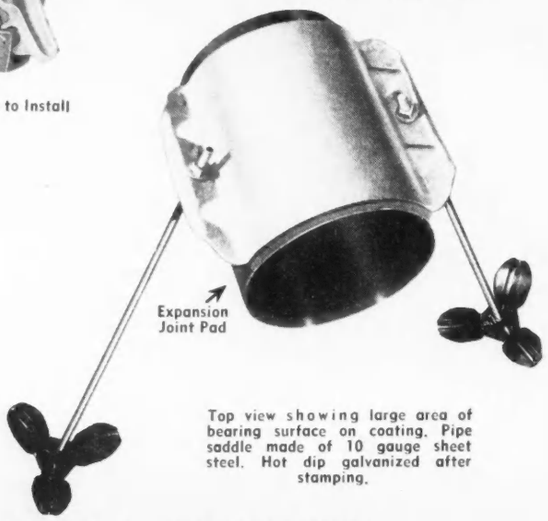
View of Pipe Line Assembly in Flooded Waters.



Anchor Ready to Install

Photo of Pipe in Flooded Waters





Top view showing large area of bearing surface on coating. Pipe saddle made of 10 gauge sheet steel. Hot dip galvanized after stamping.

WRITE, WIRE OR PHONE FOR DETAILED INFORMATION

SOLD BY YOUR SUPPLY STORE

Grip-Tite MANUFACTURING CO.

P. O. Box 45

Marshall, Texas

GREAT BRITAIN—Continued

entire Jurassic sections. Showings were logged in one formation in Upper Jurassic, but were not commercial in this well. Another well at Henfield, in Essex, also logged showings in Jurassic in drilling to 5105 feet. Early in 1948 D'Arcy completed a 3680-foot dry hole at Willesden, just northwest of London which had reported some slight gas showings.

Refineries of Great Britain

COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery	Operating Status
A.G.W.I. Pet. Corp. Ltd. Anglo American) (Std. of N.J.)	Fawley (South Hampton)	14,000	8,000	Complete	.....
Anglo-American Oil Co., Ltd.	Pt. Ellesmere (W. Cheshire)				
	Chester	500	None	Skimming	Expanding
Berry, Wiggins & Co., Ltd.	Kingsnorth (Kent)	2,500	None	Skim-Lube	Operating
	Weaste (Manchester)	1,500	None	Skimming	.....
Cory Bros. & Co., Ltd.	Coryton (Devonshire)	4,000	2,000	Skim-Crack	.....
Herbert Green & Co., Ltd.	E. Halton (on the Humber River)	1,500	None	Skim-Lube	.....
Lobitos Oilfields, Ltd.	Pt. Ellesmere (Cheshire)	3,000	None	Skimming	Operating
London & Thames Haven Oil Wharves, Ltd.	Canvey Island (Essex)	1,500	None	Skimming	.....
	Thames Haven (London)	18,000	None	Skim-Lube	.....
Major & Co., Ltd.	Hull (Yorkshire)	1,250	None	Skim-Lube	.....
Manchester Oil Refinery, Ltd.	Trafford Park (Manchester)	3,000	None	Skim-Lube	Operating
Petrochemicals, Ltd.	Partington (Manchester)	n. a.	n. a.	Complete	Building
Shell Chemical Mfg. Co., Ltd.	Stanlow (Pt. Ellesmere)	600	None	.....	Expanding
Shell Refining & Marketing Co., Ltd.	Shell Haven Essex (London)	3,600	None	.....	Operating
	Stanlow (Pt. Ellesmere)	5,700	None	Complete	Expanding
	Heysham (Near Lancaster)	30,000	None	Skimming	Completing
Starhaven Refineries, Ltd.	Shell Haven, Essex (London)	13,000	None	Complete	Operating
	Stanlow (Pt. Ellesmere)	11,000	None	.....	Operating
IRELAND (Eire):					
Cork Harbour Oil Wharves, Ltd.	Haulbowline Island	600	None	Skimming	Shut Down
SCOTLAND:					
William Briggs & Sons, Ltd.	Dundee (Firth of Tay)	600	None	Skimming	.....
Scottish Oils, Ltd., Anglo-Iranian	Uphall (Edinburgh)	3,000	500	Skim-Crack	Shut Down
	Grangemouth (Stirling)	7,500	3,000	Skim-Crack	Operating
Starhaven Refineries, Ltd. (Shell)	Ardrossan (Ayrshire)	4,300	None	Complete	Operating
WALES:					
National Oil Refineries, Ltd. (Anglo-Iranian)	Llandarcy (Carmarthen) (Swansen)	11,000	4,000	Complete	Operating
Total	22 Plants	141,650	17,500		

Gravitymeter and refraction seismic surveys are being carried out by D'Arcy and by Anglo-American Oil Company. D'Arcy's concessions in England now total 6,806,400 acres, while Anglo-American holds prospecting licenses on more than 2½ million acres. Several structures have been mapped in Southern England.

Drilling activity showed little change with 12 complete wells representing a total of 33,203 feet of hole to compare with 11 wells and 31,713 feet of hole in 1946, although only half as many wildcats were drilled in 1947 as in 1946. At Formby the D'Arcy company completed a test to 7680 feet, the deepest well yet drilled in England, without finding oil or gas below the producing horizon at 250 feet.

Pipe line transportation has been confined to short lines from producing areas to railroad loading racks. The longest of these lines is 7.6 miles of 3-inch pipe from Kelham, through Eakring to a loading siding at Bilsthorpe. Cauton field is connected to the Kelham line with 2.6 miles of 2-inch.

Wildcats in Great Britain in 1947

PROVINCE AND FIELD	Company, Well and Location	Date Completed	Total Depth (Ft.)	Results: Formation
Nottinghamshire	Farndon 1	Sept.	2638	Dry hole. Lower Carboniferous rocks.
	Perlethorpe 1, (near Retford)	May	3750	Dry hole. Upper Carboniferous rocks.
Shropshire	Edgmond 1, (near Newport)	Oct.	887	Dry; in basement rock.
Total	3 wells		7275	

Oil Production and Producing Wells in Great Britain

PROVINCE AND FIELD	Year of Discovery	Producing Oil Wells End of 1947			CRUDE OIL PRODUCTION (Barrels)			
		Flowing	Art. Lift	Total Prod.	Daily End of 1947	Year 1946	Year 1947	Cumulative Through 1947
ENGLAND:								
Derbyshire:								
Hardstoft	1919	..	..	..	....	.....	.....	9,500
Lancashire:								
Formby	1939	..	8	8	7	3,000	2,700	57,000
Lincolnshire:								
Nocton	1943	..	..	..	....	.....	.....	300
Nottinghamshire:								
Caunton	1943	..	10	10	38	31,000	20,000	142,000
Duke's Wood	1941	1	113	114	420	182,000	154,000	1,732,000
Eakring	1939	1	55	56	240	104,000	98,000	1,066,000
Kelham Hills	1941	..	54	54	195	89,000	75,000	793,000
SCOTLAND:								
Dalkeith	....	..	2	2	....	1,235	1,309	n.a.
Total		2	242	244	900	410,235	351,009	3,799,800

Note: All currently producing fields operated by D'Arcy Exploration Co., Ltd. except Dalkeith, operated by Anglo-American Oil Company.

Drilling in Great Britain

Province and Fields	WELLS COMPLETED IN 1946					WELLS COMPLETED IN 1947					Wells Drilling and Shut Down at End of 1947		
				TOTAL					TOTAL				
	Oil	Gas	Dry	Wells	Footage	Oil	Gas	Dry	Wells	Footage	Drlg.	SD	Total
ENGLAND													
Derbyshire													
Wildcat	....	....	1	1	3,369	....	....	....	....	....	....	....	....
Doncaster													
Wildcat	....	....	1	1	5,000	....	....	....	....	....	....	....	....
Lancashire													
Formby	1	....	....	1	255	....	....	1	1	7,680	....	....	....
Nottinghamshire													
Caunton	....	....	1	1	2,308	2	....	....	2	4,837	....	2	2
Duke's Wood	1	....	....	1	2,625	1	....	....	1	2,615	....	2	2
Eakring	2	....	....	2	4,512	2	....	2	4	8,801	....	5	5
Wildcat	....	....	....	....	....	....	....	2	2	6,388	1	....	1
Shropshire													
Wildcat	....	....	....	....	....	....	....	1	1	887	....	....	....
Yorkshire													
Wildcats	....	....	3	3	10,511	....	....	....	....	....	....	....	....
SCOTLAND													
Dalkeith	....	....	....	....	....	....	....	1	1	1,995	....	2	2
Wildcat	....	....	1	1	3,183	....	....	....	....	....	....	....	....
Totals	4	....	7	11	31,763	5	....	7	12	33,203	1	11	12

Announcing ATLAS GUNS

The new ATLAS Perforating Gun has already proved in the field the following characteristics:

1. **Maximum penetration**
2. **Maximum number of shots**
3. **Maximum precision in the placing of bullets**
4. **Maximum safety**

The ATLAS Gun has a relatively small diameter, 3⅝ inches, and, therefore, can be used safely in all casings from 5 inches OD up. It is, however, a very powerful gun. Controlled tests under pressure and temperature show penetration of three casings or better.

The regular ATLAS Gun is a **45-shot** gun. For large operations, the number of shots can be increased to 63 per run.

The spacing of the bullets is only 2 inches (at a 90° angle). **Without moving** the gun, the operator has the choice of shooting 2, 4, or 6 shots per foot.

Several safety devices make it impossible to fire the ATLAS Gun accidentally.

ATLAS WELL SERVICE CORPORATION

P. O. Box 4042 Houston 14, Texas

TELEPHONE: K. 3-5514. If No Answer Call: M. 2-5835, V. 4-2038

GREAT BRITAIN—Central England Fields

Best answers yet to THREE PACKING PROBLEMS!

FOR STEAM RODS

UNIVERSAL STYLE 678 STEAM ROD PACKING

- **Gives good service at pressures of 500 pounds and temperatures up to 850° F. and 600' per minute travel.**
- **Same material all the way through.** Cannot be installed wrong — will not score or burn rods.
- **Will not extrude** — yet keeps on sealing until gland is up. Then add just one ring instead of a complete new packing.
- Gives longest life and greatest service under severe conditions.
- Available in die-formed split rings or spiral form for all pumps.

FOR PUMP LINERS

MATTCO LINER PACKING

- **Gives complete protection** against costly cutout during entire life of liner.
- **Holds the highest pressures** with complete safety.
- **Will not extrude.**
- **Expansion rings give positive seal.**
- **Guaranteed.**
- **Economical.** Seal rings replaceable —metal parts can be used many times.

FOR FLUID-END RODS

UNIVERSAL STYLE 777

(Pat. Pending)

FLUID ROD PACKING

- **Longest rod and packing life under field conditions.**
- **Normal tightening will not crush packing or burn rod.** Exclusive ring design gives true lip seal under all conditions.
- **Alternate rings** of synthetic and moulded fabric gives longest trouble-free packing service.
- **Rings are split** — for quick, easy installation.

UNIVERSAL

MAKE UNIVERSAL YOUR PACKING AND GASKET HEADQUARTERS

PACKING — of all types for all purposes and kinds of service.

GASKETS AND GASKET MATERIALS — A complete line of gaskets for all oil field purposes — hard or soft, metallic or non-metallic.

REGULATING DIAPHRAGMS — for all types and makes of regulators.

Sold through supply stores everywhere

UNIVERSAL PACKING & GASKET COMPANY

5210 CLINTON DRIVE — Telephone Charter 4-6757 — HOUSTON, TEXAS

EXPORT SALES: Hunt Export Company, 19 Rector St., New York; Adva. Pte. R. Saenz Pena 832, Buenos Aires; Port of Spain, Trinidad; Mexico City, D.F.

HUNGARY

HUNGARY'S production, which had shown a slight increase in 1946 over the previous year, slumped in 1947 to 4,330,430 barrels, lowest since 1941, and 814,908 barrels less than 1946. The decline was general in all fields, production at Lovaszi falling 404,780 barrels below 1946 despite the completion of 11 producing wells. There are now 89 wells in the field of which 27 are pumping.

The most significant development of 1947 was the establishment by MAORT of the Hahot-Ederics gas-distillate area just west of the Hahot oil producing area. Late in 1946 indications of gas production had been found here in the Lower Pliocene formation. Since then five wells have been completed and three old dry holes were worked over and completed as gassers. There are now nine wells with a combined potential of 27 million cubic feet of gas daily through small chokes, and the gasoline content runs approximately one gallon per thousand cubic feet of gas. The production is from sand and sandstones between 4592 and 4920 feet. Prospecting continues in search of oil production in the area. Other wildcatting included dry holes south and east of Lovaszi, the eastern well showing some gas and oil, and drilling of two dry holes in the Igal area 18 miles northeast of Kaposvar.

Meanwhile the Soviet Hungarian Oil Company has drilled three wells in all on the Korosszegapati prospect 125 miles southeast of Budapest near the Roumanian border, and at the close of the year was drilling two wildcats in the Biharnagybajom area 20 miles to the west. One 3300-foot dry hole was drilled on the prospect during 1947.

Engineering and Geological Data on Hungary Fields

COUNTY AND FIELD	Proved Area (Acres)	Range of Gravity Oil (A.P.I.)	Name	Kind	Age	Depth (Ft.) Min. to Top of Pay	Depth (Ft.) Max. to Bottom of Pay	Avg. Thickness of Pay (Ft.)	Type of Structure
Heves:									
Bukkszek	....	....	.....	Tuff	Oligocene	250	4462	..	Anticline.
Zala:									
Budafapussta	2330	42.5	Lr. Pannonian	Sand	L. Pliocene	3500	5786	39	Anticline.
Hahot	145	31.3	.....	Limestone	L. Pliocene-Miocene	4675	4770	98	Buried Hill
Lovaszi	2550	40	Lovaszi	Sand	L. Pliocene	3950	5139	75	Dome.
Ujfalu	86	....	.....	Sand	Pliocene	2300	5790	22	Dome.

Oil Production and Producing Wells in Hungary

County and Field	Year of Discovery	Producing Oil Wells End of 1947 Flowing	Art. Lift	Total Prod.	CRUDE OIL PRODUCTION (Barrels) Daily at End 1947	Year 1946	Year 1947	Cumulative Thru 1947
Heves:								
Bukkszek	1937	..	?	?	?	.....	1,065	86,199
Zala:								
Budafapussta	1937	33	41	74	3,029	1,562,712	1,235,554	15,873,808
Hahot	1942	3	2	5	1,092	552,699	468,660	2,818,034
Lovaszi	1940	62	27	89	6,377	3,029,931	2,625,151	20,131,417
Ujfalu	1941	..	..	..	.....	Shut In		13,362
Total		98	76	168	10,498	5,145,342	4,330,430	38,922,820

Note: All fields operated by Magyar Amerkai Olajipari Rézvénytársáság, except Bukksek which is Hungarian Government.

Refineries in Hungary

COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery	Operating Status
Fanto Associated Hungarian Oil Co., Ltd.	Budapest	1100	None	Skim-Lube	Operating
Maygar Hydrobenzin Részvénytársaság	Pétfürdö	1200	350	Skim-Cracking	Operating
Magyar Pet.-Dr. Freund	Csepel (Budapest)	1100	None	Skim-Lube	Operating
Nyiregyhaza Petroleumgyar Részvénytársaság	Nyíregyháza	300	None	Skim-Lube	Operating
Shell Koolaj Részvénytársaság	Csepel (Budapest)	3850	None	Skim-Lube	Operating
Soviet-Hungarian Oil Co.	Pécs	5500	....	.....	Building
Szoregi Petroleumfabrik	Szöreg (Szeged)	420	None	Skim-Wax	Operating
Vacuum Oil Co. Részvénytársaság	Almásfüzitö (Szöny)	3800	None	Lube-Wax-Asphalt	Operating

Wildcats Completed in Hungary in 1947

County	Company, Well, Location	Date Completed	Total Depth (Feet)	Results Formation
Zala:	Magyar Amerikai Olajipari Részvénytársaság (MAORT) Hahot-Ederics Gasfield 2 miles west of Hahot Oilfield:			
	Well HE 31	2–10	5571	3/8" choke, 9 million cu. ft. gas, L. Pliocene, sand, sandstone.
	32	5–26	5889	3/8" choke, 1.5 million cu. ft. gas, L. Pliocene sand, sandstone.
	33	6–23	5019	3/8" choke, 0.4 million cu. ft. gas, L. Pliocene sand, sandstone.
	29 (worked over)	7–28	5597	3/8" choke, 1.8 million cu. ft gas, L. Pliocene sand, sandstone.
	34	8–18	5720	3/8" choke, 2.5 million cu. ft. gas, L. Pliocene sand, sandstone.
	35	10–13	5019	3/8" choke, 3.5 million cu. ft. gas, L. Pliocene sand, sandstone.
	Prince, 2 miles south of Lovaszi oilfield: Well P. 1	4–14	6185	Dry, abandoned in L. Pliocene.
	Vetyem, 4 miles east of Lovaszi: Well V 1	12–28	5525	Some wet gas, good oil show, L. Pliocene.
Somogy:	Igal, 18 miles south of Kaposvar			
	Well I 1	4–18	2136	Dry, abandoned in Triassic.
	2	9–18	4979	Dry, abandoned in Miocene.
Great Plains:	Soviet Hungarian Oil Company: Bugyi, 20 miles south southeast of Budapest:			
	Bugyi 1	n. a.	850	Dry, abandoned in Triassic.
	2	n. a.	850	Dry, abandoned in Triassic.
Bihar:	Biharnagybajom	n. a.	3300 (approx.)	Dry, abandoned in Miocene.
Total	13 wells		56,640	

Drilling in Hungary

County and Fields	WELLS COMPLETED IN 1946 Oil	Gas	Dry	TOTAL Wells	Footage	WELLS COMPLETED IN 1947 Oil	Gas	Dry	TOTAL Wells	Footage	Wells Drilling and Shut Down at End of 1947 Drlg.	SD	Total
Biliar													
Wildcats	....	....	....	....	....	....	....	1	1	3,300	....	....	....
Great Plains													
Wildcats	....	....	....	....	....	....	....	2	2	1,700	....	....	....
Somogy													
Wildcats	....	....	....	....	....	....	....	2	2	7,115	....	....	....
Zala													
Hahot	....	3	....	3	15,750	....	....	....	....	....	....	....	....
Lovaszi	12	....	....	12	63,000	11	....	....	11	49,753	2	7	9
Wildcats	....	....	....	....	....	....	6	2	8	44,525	2	....	2
Totals	12	3	....	15	78,750	11	6	7	24	106,393	4	7	11

SOUTHERN

PRECISION SEISMIC SURVEYS

REFLECTION

REFRACTION

•

DATA REANALYSIS

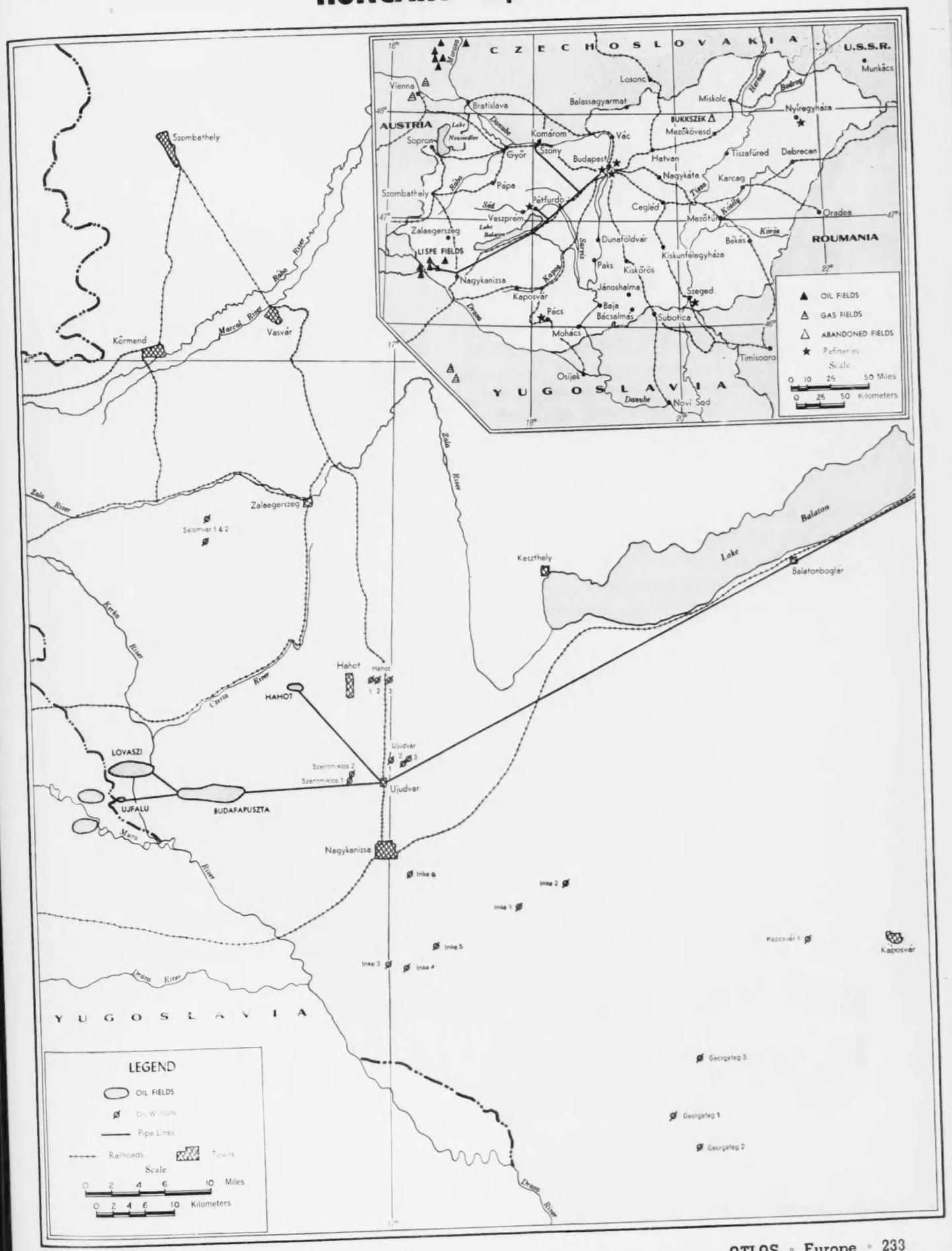
•

SOUTHERN GEOPHYSICAL COMPANY

SIDON HARRIS, PRESIDENT

SINCLAIR BUILDING FORT WORTH, TEXAS

HUNGARY—Lispe Fields



HOMES!

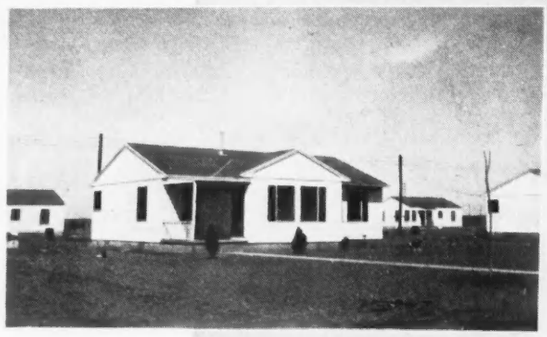
for the Oil Industry . .

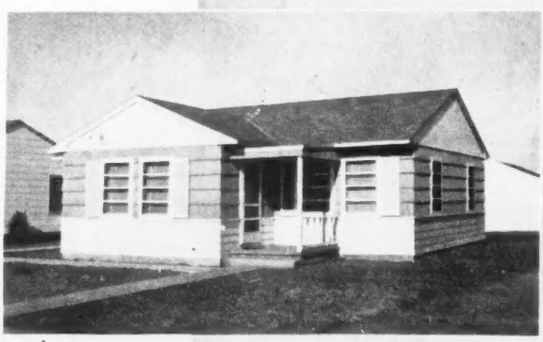
Since 1917, thousands of HOUSTON HOMES have been shipped to oil fields and pipe line pumping stations all over the Western Hemisphere. And wherever they were erected they have proved the successful answer to industry's problem of providing attractive, modern housing facilities in mass quantity and at low cost.

Employees like HOUSTON HOMES because they are real homes, not just "camp houses." Management likes HOUSTON HOMES because they are economical, come complete, and are available immediately in any quantity.

Pictured on the right are three HOUSTON HOMES which have recently been erected for major oil companies in new industrial communities. Four, five and six room houses are available, and the cost is surprisingly low. Houston Ready-Cut House Co., Inc., can furnish any one of its various floor plans (turnkey, utilities stubbed five feet outside the building) for less than $8.00 per square foot anywhere in the State of Texas.

Call or write for further information. One of our representatives will be glad to call on you.





HOUSTON Ready-Cut HOUSE CO., Inc.

Prefabricators Since 1917

P. O. BOX 124 HOUSTON 1, TEXAS

PREFABRICATED HOME MANUFACTURERS' INSTITUTE phmi

ITALY

ITALY's production of crude oil during 1947 was no more than 220 barrels daily, although preparatory activity during the year points to an increase in drilling in an effort to develop more reserve. Of more value than the crude oil is its gas production in the Po Valley and other northern areas, being used as domestic and industrial fuel, and which increased in 1947 to more than 3½ billion cubic feet, or approximately a billion more than was produced in 1946.

It now appears that the Po Valley may prove more important than the Appenines area where most former work was concentrated, and the results of deep drilling, now scheduled as deep as 9000 feet, will be watched with interest. During the year geophysical work in the San Giorgio-Piacentino district indicated structures as deep as the Lower Oligocene, and with acquisition of heavy drilling equipment, more conclusive prospecting should be done during 1948 and 1949 in this and other areas.

Of interest is the activity of MacMillan Petroleum Corporation, expected to start drilling early in 1948 on a series of prospects on its 67,000 acres of concessions in Sicily.

The outstanding feature of Italy's oil industry is its efforts to bulid up refining capacity to one of the greatest of any of the European nations.

Refineries of Italy

COMPANY	Location of Plant	Crude Charging Capacity, (Bbls. Daily)	Cracking Capacity, (Bbls. Daily)	Type of Refinery	Operating Status
Industria Raffinazione Olii Minerali (A.G.I.P & Anglo-Iranian Oil Co.)	Venice	5,800	3,100	Skim-Crk.	Enlarging
Azienda Nasionale Idrogenazione Combustibili & Standard O. Co. (N.J.)	Bari	5,000	2,000	S-C-W-A-	Operating
	Leghorn	4,500	2,000	S-C-W-A	Operating
Raffineria de Napoli S.A.I. (Socony-Vacuum)	Naples	5,500	None	Skim-Crk	Rebuilding
Distillazione Italiana	Porto Maghera (Venice)	5,600	3,500	Skim-Crk.	Rebuilding
Combustibili S.A.					
"Nafta" Societa Italiana del Petrolio ed Affini (Duteh-Shell)	La Spesia	6,000	1,500	Skim-Crk	Enlarging
Societa Petrolifera Italiana (Standard Jersey)	Fornovo (Parma)	1,000	None	Skimming	Operating
Societa Idrocarburi Nazionali de Florence	Pietramala				Operating
Total	8 Plants	33,400	12,100		

Production and Geology of Italy's Oil Fields

Province and Field	Operating Company	Year of Discovery	OIL PRODUCTION 1946	OIL PRODUCTION 1947	Gravity of Oil	Geologic Age	Type of Structure
Florence and Bologna:							
Pietramala-Castel dell Alpi	Societa Idrocarboni Nazionali (SIN)	1925	7,200	6,190	36.9	Mio-Cretaceous	Anticline
Frosinone							
Ripi	AGIP	1920	4,000	3,700	17.4	Miocene	Anticline
Parma							
Parma Province	Azienda Generale Italiana Petroleum (AGIP)	....	2,100	1,800	43	Pliocene-Mio.	Anticline
Salso	Societa Petrolifera Italiana (SPI)	1923	6,685	5,775	44	Miocene	Anticline
Salso Terme	Terme and Statli	n. a.	930	900	43.2	Miocene	Anticline
Vallezza	SPI	1907	36,793	35,650	50.6	Oligocene-Eoc.	Monocline
Vissola	SPI	1941	2,194	2,100	32.8	Plio-Mio.	Anticline
Pescora							
Tramutola	AGIP	1936	5,700	5,600	22	Eocene	Anticline
Tocco-Casauria.	AGIP	1935	6,000	3,000	20	Miocene	Anticline
Piacenza							
Montechimo-Velleja.	Various small companies	1890	7,800	7,700	52	Eocene-Cret.	Anticline
Podenzano	AGIP	1931	3,000	2,900	29	Pliocene-Mio.	Antioline
Rallio	SURGI and RAI	1908	1,500	1,500	50.6	Eocene	Anticline
San Giorgio	AGIP	1942	3,400	3,300	31.1	Miocene	Anticline
Total			87,302	80,115			

THE NETHERLANDS

HOLLAND'S Schoonebeek Field, still the only producing area in The Netherlands, expanded rapidly during 1947, giving indications of becoming one of the largest fields in Western Europe with further development. During the course of the year drilling continued on a plan of stepping out to define the limits of the producing area, with some success. At the close of the year its area had expanded to include some 8 miles east and west, and about 5 miles north and south, exclusive of the portion lying south of the Dutch-German border known as Emlichheim.

Although production was found in 1943, as the first oil field in the Netherlands, little work was done during the war, and at the end of hostilities there were only two producing wells. Since then development has been rapid. The operations are carried on by N. V. Nederlandse Aardolie Maatschappij (Jointly owned by Standard Oil Company (N. J.) and N. V. de Bataafsche Petroleum Maatschappij), and at the close of last year 38 oil wells had been completed, 31 of which were on active production at a rate of 6098 barrels daily. Total output for the year was 1,478,078 barrels, more than a million barrels greater than 1946 production. The average for the entire year was in the neighborhood of 4000 barrels daily, so a substantial increase can be expected for 1948.

Seventeen wells were completed in the Schoonebeek field during 1947, for a total of 56,902 feet of hole, and 15 were producers. At the close of the year two rigs were being used in drilling deep exploratory wells, one west of Coevorden and one at Delft.

Production in the field is obtained in the Lower Cretaceous in a sand section about 100 feet in thickness found at depths between 2500 and 2650 feet, on an anticlinal structure whose axis apparently trends almost due east and west, although more flank drilling is needed to definitely establish the shape of the producing area. Some of the wells in the southern part of the area, on the German side of the border have begun to show signs of water intrusion, which could be evidence of a water drive which could benefit operators to the north and on the crest of the structure.

Salient Data on Schoonebeek Field

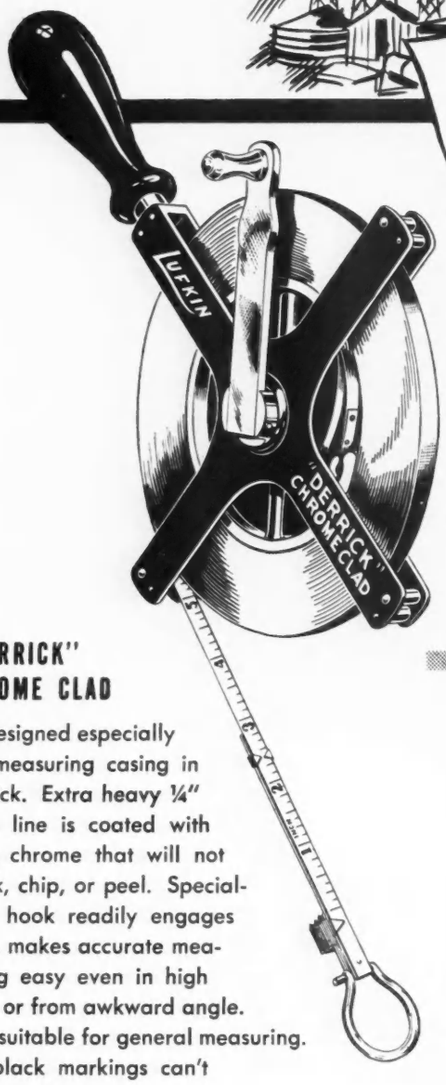
Operating Company—N. V. Nederlandse Aardolie Maatschappij (50% S.O.C. (New Jersey) 50% N. V. De Bataafsche Petroleum Maatschappij).

Year of Discovery	1943
Producing Wells, Oil, Flowing	1
Pumping	30
Daily Production, end of 1947	6,098
Production in 1946	435,420
Production in 1947	1,478,078
Cumulative to End of 1947	1,967,869
Wells Drilled in 1947—Oil	15
Gas	None
Dry	2
Total Wells	17
Footage Drilled	56,902
Field Wells Drilling—End of 1947	1
Estimated Proven Area of Field	2,500
Gravity of Oil (A.P.I.)	24.8
Producing Formation—Local Name	Valanginian
Kind	Sand
Age	L. Cretaceous
Minimum Depth to Top of Pay	2500
Maximum Depth to Bottom of Pay	2650
Average Thickness of Pay	80
Type of Structure	Antieline

FOR ACCURATE, DEPENDABLE MEASURING

THE OIL INDUSTRY TURNS TO LUFKIN

Finest Construction and Enduring Accuracy Make Lufkin Tapes, Rules, and Precision Tools First Choice Among Oil Men.



"DERRICK" CHROME CLAD

• Designed especially for measuring casing in derrick. Extra heavy ¼" wide line is coated with satin chrome that will not crack, chip, or peel. Special-type hook readily engages pipe, makes accurate measuring easy even in high wind or from awkward angle. Also suitable for general measuring. Jet black markings can't scrape off or wear out.

"ATLAS" CHROME CLAD

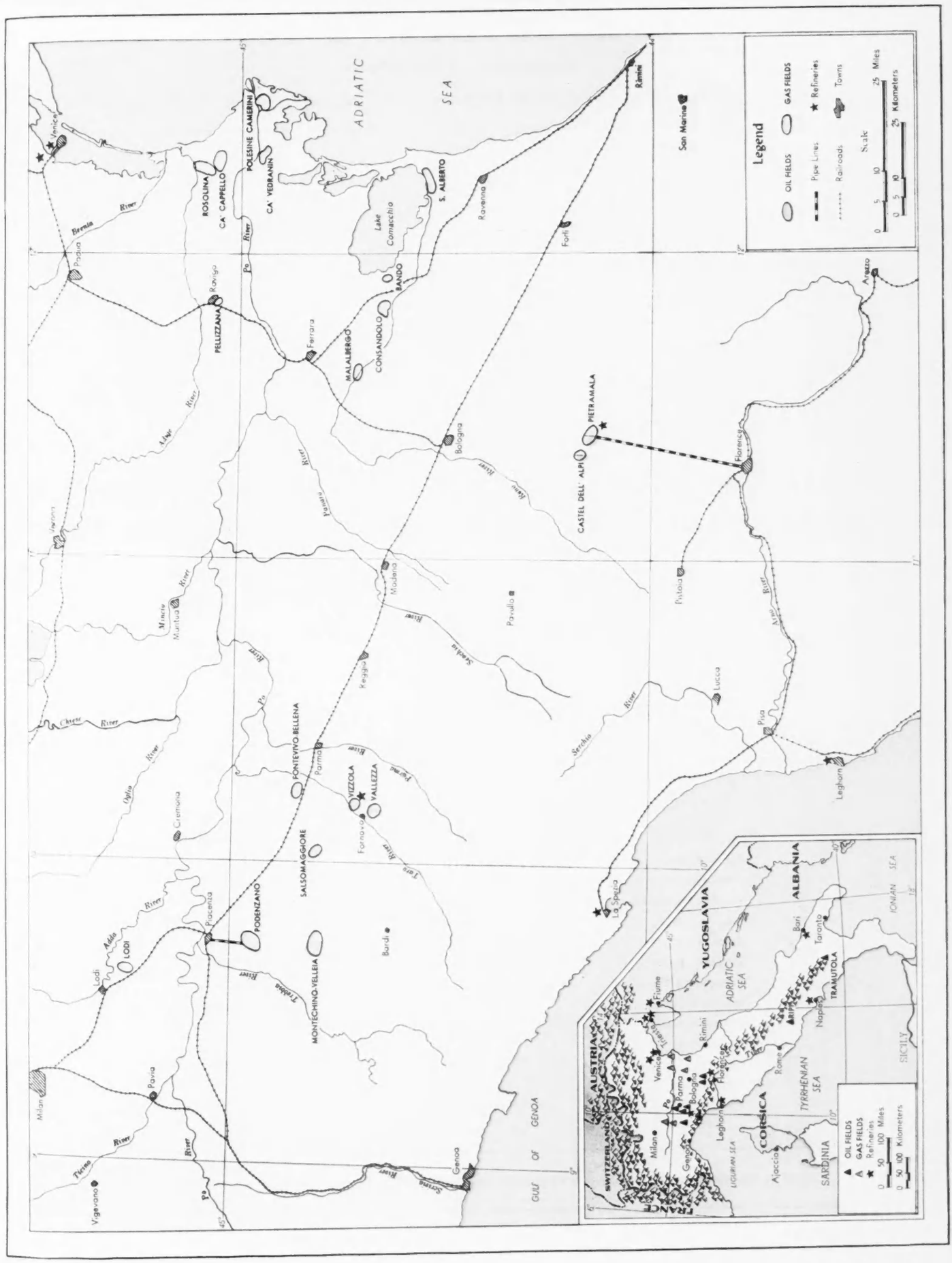
• The perfect oil gaging tape, with extra heavy ½" wide line coated with tough satin chrome that will not crack, chip, or peel. Simplifies accurate measuring, because the non-glare line makes a perfect background for the oil level and the jet black markings are always easy to read. Rust-resistant, wipes clean in a jiffy.

LUFKIN

Other Lufkin tapes and rules that are of special service to the oil industry include "Peerless" Chrome Clad Tank Strapping Tapes, "Anchor" Chrome Clad Steel Tapes for general measuring, Metallic Woven Tapes, and "Mezurall" Tape-Rules. Contact your supply house for prompt service. Write direct for free catalog.

THE LUFKIN RULE CO., SAGINAW, MICH. • New York City

ITALY—Po Valley Fields



E. W. SAYBOLT & CO.

Inspectors of Petroleum

Dependable Inspection Service at All Oil Ports on the Atlantic, Gulf and Pacific Coasts

A. M. SMYTHE CHAS. M. SMYTHE JOS. H. McCABE

Members of the Firm Approved and Licensed by the New York Produce Exchange

Cable Address "SAYBOLTOIL"

All Codes Used—Specify

Specializing in

INSPECTION OF BULK CARGOES . . . LABORATORY ANALYSIS
CALIBRATION OF TANKS, PRESSURE VESSELS, BARGES AND SHIPS

Assure Satisfaction . . . Select Saybolt Specialized Services

Independent—Unbiased—Competent

☆

EAST COAST HEADQUARTERS
265 Bayway, Elizabeth, N. J.

GULF COAST HEADQUARTERS
712 Petroleum Bldg., Houston, Texas

WEST COAST HEADQUARTERS
529 Avalon Blvd., Wilmington, Calif.

OFFICES AND LABORATORIES

EAST COAST
- Portland, Me.
- Boston, Mass.
- West Haven, Conn.
- New York, N. Y.
- Bayonne, N. J.
- *Elizabeth, N. J.
- *Philadelphia, Pa.
- Marcus Hook, Pa.
- Baltimore, Md.
- Norfolk, Va.
- Charleston, W. Va.
- Toledo, Ohio
- *Whiting, Ind.

GULF COAST
- Baton Rouge, La.
- *New Orleans, La.
- Lake Charles, La.
- Port Arthur, Texas
- Texas City, Texas
- *Houston, Texas
- *Corpus Christi, Texas
- Port Isabel, Texas
- Brownsville, Texas

WEST COAST
- Portland, Ore.
- *Seattle, Wash.
- San Francisco, Calif.
- San Luis Obispo, Calif.
- *Wilmington, Calif.

MEXICO
- *Tampico, Mexico

SOUTH AMERICA
- Las Piedras, Ven.
- Puerta La Cruz, Ven.
- Caripito, Ven.

WEST INDIES
- *Aruba, N. W. I.
- Curacao, N. W. I.

*Laboratories

"Half a Century of Peerless Service Has Earned the Confidence of Oil People Everywhere"

NORWAY

WITH continued recovery from wartime destruction, and the trend toward mechanization, Norway's needs of petroleum products are expected to increase perhaps 60 percent during the next two years. Norway is one of the few countries of Europe with no indigenous production of oil. One refinery is being operated, the plant at Vallo on Oslofjord, which had been largely demolished during the war, has now been reconstructed, going on stream late in 1947. It is operating on imported crude, but most imports are in the form of petroleum products. Recent surveys have shown more than 65 percent of industrial fuel consumers in Norway with a definite preference for petroleum fuels.

POLAND

THE Polish oil industry continued during 1947 its efforts to develop new reserves and increase the production of the old fields. These old, depleted fields were all that were left of its producing sources following the annexation by Soviet Russia of the eastern portion of the country. The portion taken over by the Russians contained approximately four-fifths of its producing capacity.

Oil production during the first 10 months of 1947 totaled 785,746 barrels, or at a rate of slightly more than 940,000 barrels for the year. It represents an increase of 75,143 barrels increase over a like period in 1946. A surprising feature is that new wells completed during the first 10 months of the year contributed only 57,320 barrels of this increase, indicating that the older wells have shown a slight reversal of the decline trend. With 2411 wells producing near the end of the year, production was averaging about a barrel daily per well. A gradual replacement of worn-out production equipment is thought responsible for the slight increase. The 82 wells completed during the first 10 months of 1947 is only six more than the same period in 1946.

Poland was one of the first countries to produce oil commercially. As early as 1874 it was producing 156,000 barrels yearly, and in 1909 was third among producing nations of the world, its 15,400,000 barrels for that year placing it behind the United States and Russia.

The current emphasis on exploration is shown by the 25 wildcat wells drilling in October as against only 12 drilling in January. No new oil was found, but substantial additions have been made to the gas reserve. The Debowiec field, discovered in 1946 is apparently a major gas reserve. Recently a third horizon has been opened at only 1285 feet whose discovery well flowed 5 million cubic feet of gas daily. Good showings of gas have also been found in Szalowa near Gorlice, in Siedlice near Bochina and in Wojslaw near Mielec.

Of particular interest was the drilling of a salt plug in one of the exploratory wells on the plains of Poland. This confirms indications of geophysical work, and several locations have been made for checking others. Eight wells in the region are scheduled for 1948. Salt was found in the Klodawa 1 at 1050 feet.

Gas production in Poland during the first 10 months of the year totaled slightly more than 4 billion cubic feet. There are only 51 gas wells, although a considerable amount of gas is produced in some areas from wells which also produce oil. One of the gas fields, Strachocina, produced nearly half of the above amount, while Roztoki-Sadkowa produced the bulk of the remainder. The latter is an oil field from which much gas is produced.

Building up of gas reserves of the country resulted in plans for expansion of the network of gas transmission lines. This expansion has as its purpose supplying gas not only to towns and cities for domestic use, but also to industrial centers which are located some distance from the sources of supply of coal. Largest of these projects is a proposed gas line to Warsaw. Assuming availability of pipe, this line in scheduled

Drilling in Poland

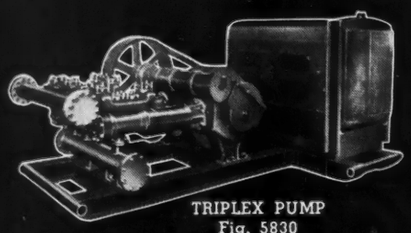
FIELDS	WELLS COMPLETED IN 1946		WELLS COMPLETED JAN.-OCT. 1947	
	Total	Footage	Total	Footage
Klęczany-Starawies	..	17,483	..	965
Sękowa-Szymbark	5	5,147	5	5,062
Gorlice-Ropica Polska	1	230	..	.....
Gorlice-Lipinki	14	15,965	28	25,958
Biecz	5	6,249	2	5,804
Harklowa	3	2,027	1	1,667
Roztoki-Sadkowa	4	6,180	..	2,920
Dobrucowa-Jaszczew	1	5,409	2	5,367
Potok	1	2,578	1	1,988
Turasówka	..	659	1	111
Krościenko	..	342	1	5,328
Bratkówka	..	446	..	502
Węglówka	.....	.....	2	1,296
Iwonicz-pld	4	3,628	4	3,405
Iwonicz-pln	.....	1,420	.....	3,248
Bóbrka	3	8,007	6	9,117
Lęsany-Targowiska	1	62	..	548
Zmiennica-Tursepole	2	5,592	4	6,670
Grabownica	34	13,258	22	13,619
Strachocina	..	4,251	..	4,977
Zagórz-Wielopole	.....	.....	.....	837
Mokre-Rajskie	6	1,892	3	1,627
Witrylów	..	158	..	.....
Wańkowa	1	531	..	.....
Total	85	101,514	82	101,016

Oil Production and Producing Oil Wells in Poland

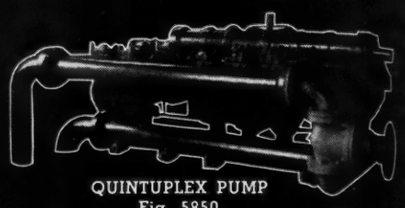
FIELDS	Year of Discovery	PRODUCING OIL WELLS OCT., 1947			CRUDE OIL PRODUCTION (Barrels)		
		Flowing	Art. Lift	Total Producing	Daily at End of Oct., 1947	Year 1946	January-October, 1947
Klęczany-Starawies	1858	..	9	9	1	348	242
Sękowa-Szymbark	1875	..	73	73	23	6,623	5,427
Rzepiennik	1930	..	3	3	2	664	558
Męcina Wielka	1909	..	32	32	5	1,711	1,341
Gorlice-Ropica Polska	1931	..	107	107	99	33,546	28,866
Gorlice-Lipinki	1865	..	772	772	561	179,389	158,043
Biecz	1897	..	65	65	74	26,180	21,141
Harklowa	1870	..	162	162	125	44,865	35,413
Roztoki-Sadkowa	.....	3	1	4	29	6,922	7,402
Dobrucowa-Jaszczew	.....	2	22	24	84	29,535	23,683
Potok	1891	..	47	47	109	29,828	30,995
Turasówka	.....	..	56	56	287	85,517	78,881
Krościenko	.....	1	46	47	85	20,539	19,399
Bratkówka	.....	..	.....	.....	.....	.....	.....
Węglówka	1887	..	81	81	53	16,696	14,698
Iwonicz-pld	1890	..	86	86	103	28,886	26,589
Iwonicz-pln	.....	..	29	29	3	1,482	1,349
Lesyny	.....	..	2	2	2	907	714
Bóbrka	1858	..	109	109	213	59,147	54,625
Ropianka	1868	..	13	13	2	576	676
Lęsany-Largowiska	.....	..	1	1	.....	1,007	308
Długie	.....	..	11	11	1	359	284
Rudawka Rym.-Tokarnia	1899	..	15	15	4	1,181	1,135
Zmiennica-Tursepole	1896	..	58	58	123	42,578	36,635
Grabownica	1896	..	94	94	342	103,181	102,447
Strachocina	.....	..	.....	.....	.....	.....	.....
Zagórz-Wielopole	1885	..	10	10	39	2,283	8,472
Mokre-Rajskie	1914	..	60	60	47	12,160	15,016
Witrylów	1880	1	22	23	7	2,983	1,973
Tyrawa-Solna	1897	..	30	30	49	4,151	11,483
Wańkowa	1885	..	388	388	329	122,840	97,951
Total		7	2,404	2,411	2,801	866,084	785,746

Note: All fields operated by Polish Government.

DUPLEX PUMP
Fig. 2070
7" x 10" V-BELT



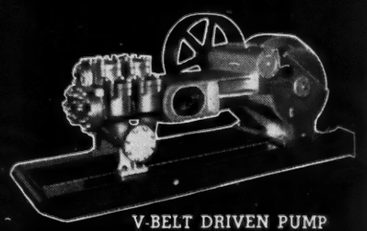
TRIPLEX PUMP
Fig. 5830
5¾" x 8" V-BELT



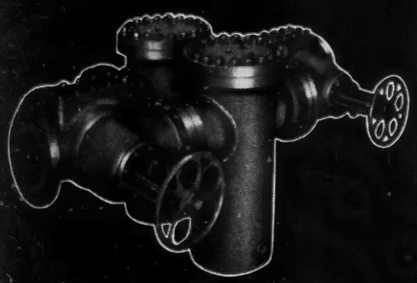
QUINTUPLEX PUMP
Fig. 5850
5¾" x 8"

DIRECT DRIVEN PUMP
Fig. 1324
4" x 6"

When it Comes to PIPE LINES Come to WHEATLEY



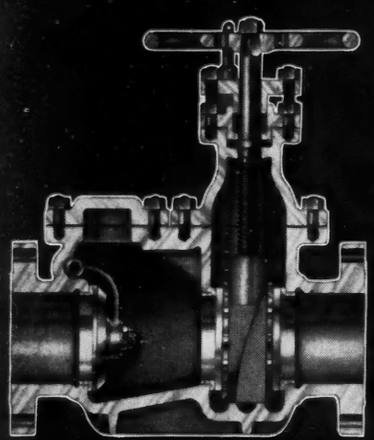
V-BELT DRIVEN PUMP
Fig. 2170



TWIN STRAINERS
4" to 12"

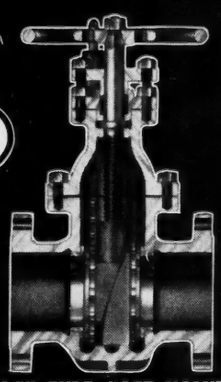
SYNTHETIC RUBBER SEAL
CHECK VALVES
2" to 18"

These are only a few of our many pipe line products. They are made in various sizes and are adaptable to many installations. Our aim is to be the one company where anything for pipe line transportation can be purchased. Please let us have your requirements.

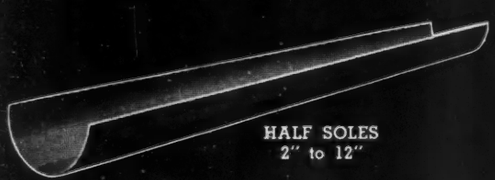


RACK TYPE TWIN VALVES
4" to 12"

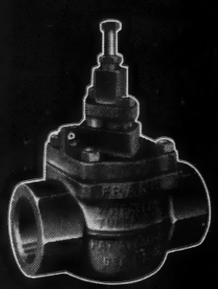
WHEATLEY



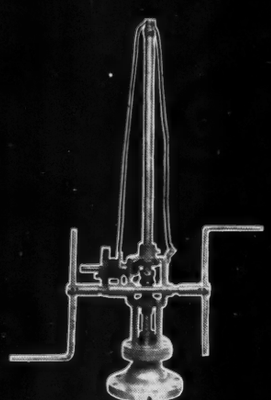
RACK TYPE GATE VALVES
4" to 12"



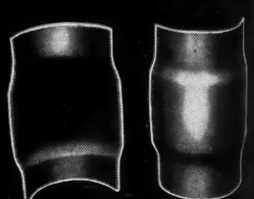
HALF SOLES
2" to 12"



PLUG VALVES
2" to 6"
Non-Lubricated
Mechanically Operated



TAPPING MACHINES



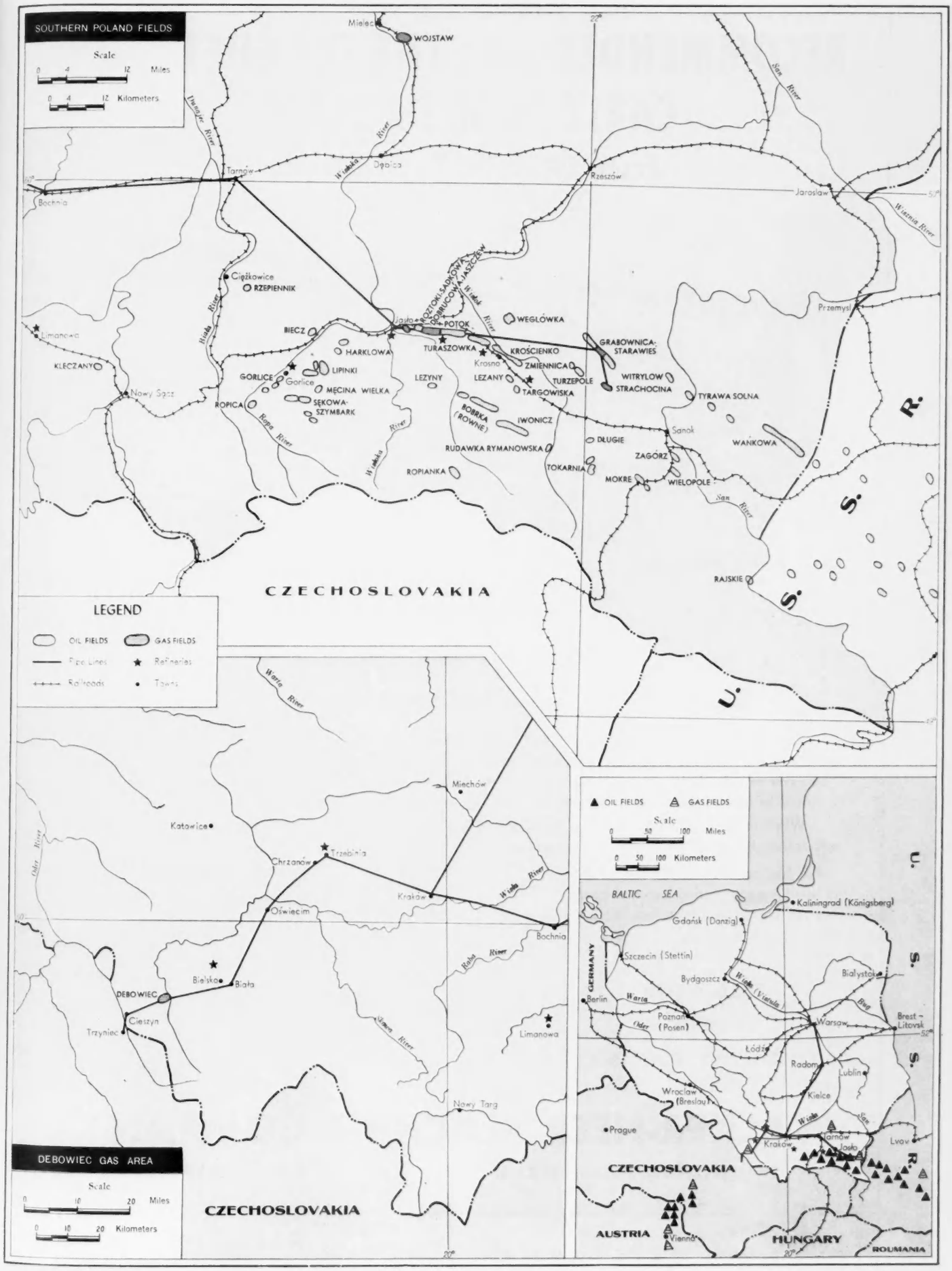
WELDING SLEEVES
2" to 12"

FRANK WHEATLEY PUMP & VALVE MFR.

• PIPE LINE SUPPLIES •

TULSA 6, OKLAHOMA, U.S.A.

POLAND—Southern Fields



RECOMMENDED FOR THE TOUGHEST OF CABLE TOOL DRILLING

From 1000 Ft. To 9000 Ft.

With WALKER-NEER SPUDDERS In Eleven Modern Models

Contractors who satisfy themselves and their customer are buying the New Walker-Neer all steel Spudders—These compact units can be moved as a skid unit, truck mounted, or semi-trailer. Drilling Tools can be left strung up, and are in position to work when the heavy duty tubular, telescoping derrick is raised by rig power at a new location; cutting rig-up time to a minimum.

Whether on well service work, or heavy top to bottom drilling, the smooth fast finger-tip operation will satisfy the toughest demand on a spudder.

For big capacity spudders capable of handling your varied jobs and handing you steady profits, select Walker-Neer Spudders.

FIELD-TESTED

PROVEN

COMPLETELY PORTABLE

MODELS

C-37- 9000 Ft.
S-33- 5000 Ft.
C-33- 5000 Ft.
C-32- 3000 Ft.
S-32- 3000 Ft.
S-31- 1000 Ft.
C-23- 3000 Ft.
P-23- 3000 Ft.
C-22- 2000 Ft.
P-22- 2000 Ft.
P-12- 2000 Ft.

WALKER-NEER MACHINE COMPANY

WICHITA FALLS, TEXAS **PH. 25429**

POLAND—Continued

for completion sometime in 1948. Proposed building of gas lines from Deboweic to Cieszyn and some of the neighboring towns in Czechoslovakia has been postponed indefinitely, since the indicated demand did not justify the cost of construction.

During World War II the Polish oil industry suffered little direct war damage, but withdrawals from its greatly depleted fields were excessive in view of the urgent need of combatants for petroleum and its already shrinking reserves were reduced much too fast. It is estimated that no more than 15 million barrels of crude oil reserve remain in presently discovered fields. The development within proven fields is almost entirely completed, and the only way in which its production may be bolstered outside of new discoveries is by the institution of secondary recovery programs. There is also a need for much production equipment to replace that worn out and irreplaceable during the war years.

Thus far most efforts at secondary recovery have been along the lines of repressuring with gas, with encouraging results, although the nature of most Polish reservoirs is not such as normally would be most fitted to repressuring. All production occurs in the "Flysch" beds of Oligocene and Cretaceous age and source beds are lenses of alternate sands, shales and boulders, greatly deformed and strongly overthrust. This makes for non-continuous reservoirs, and areas affected by individual injection points are comparatively small.

It is thought that the most favorable territory for possible new discoveries is in the northwest part of the country wherein is located the eastern part of a Cretaceous-Tertiary basin extending into North Germany.

Refineries of Poland

Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Daily Crude Runs End of 1947 (Bbls.)	Type of Refinery	Operating Status
Jedlicze	1200	None	895	Skim-Lube	Operating
Jasło	1500	None	858	Skim-Lube	Operating
Czechowice	1600	300	118	S-L-Wax	Operating
Trzebinia	1500	None	585	Skim-Lube	Operating
Glinnik Mariompolski	1500	None	1362	Skim	Operating
Total, 5 Refineries	73,000	300	3,818		

Note: All operated by Polish Oil Industry

PORTUGAL

PORTUGAL has no sources of crude oil or natural gas within the nation itself, depending largely on what coal remains in its mines, and on imported crude oil and products for its fuels. The Sociedade Anonima Concessionaria da Refinicão do Petróleos em Portugal (SACOR), owned one-third by the State, built a refinery just before the war under agreement that it would furnish half the country's fuel requirements from the refinery. The capacity was insufficient as the first units were built, but is scheduled to be increased to near 5000 barrels daily.

ROUMANIA

ALTHOUGH Roumania continues as the largest producer of oil in Eastern Europe, its rate of output has declined steadily through the past few years and efforts to accelerate its exploration and drilling programs have thus far failed to uncover any substantial new reserve or to halt the decline. In 1947 its fields produced 28,772,634 barrels, an average of approximately 78,000 barrels a day, and a decrease of 55 percent below its all-time peak of 175,000 barrels daily in 1936. Of its total production it is estimated that 46 percent is exported to Russia. Exports to other countries were of relatively minor importance.

The Sovrompetrol, a Russian-dominated group has strengthened its position in the nation's industry. Creditul Minier, one of the important producers, was taken over in July of last year by the Government so that it could be placed under the direction of the Sovrompetrol group. In December the Government virtually took over the management of Astra Romana, a company controlled by the Shell Group, through appointment of an administrator of its affairs and operations. Early in 1948 an administrator was appointed over the Romano Americana, an affiliate of the Standard Oil Company (N. J.). Later an administrator was appointed to direct the affairs of the Distributsia Company, largely owned by Astra Romana and Romano Americana. The Distributsia company handled more than 60 percent of Roumania's total oil output.

Drilling in Roumania Fields

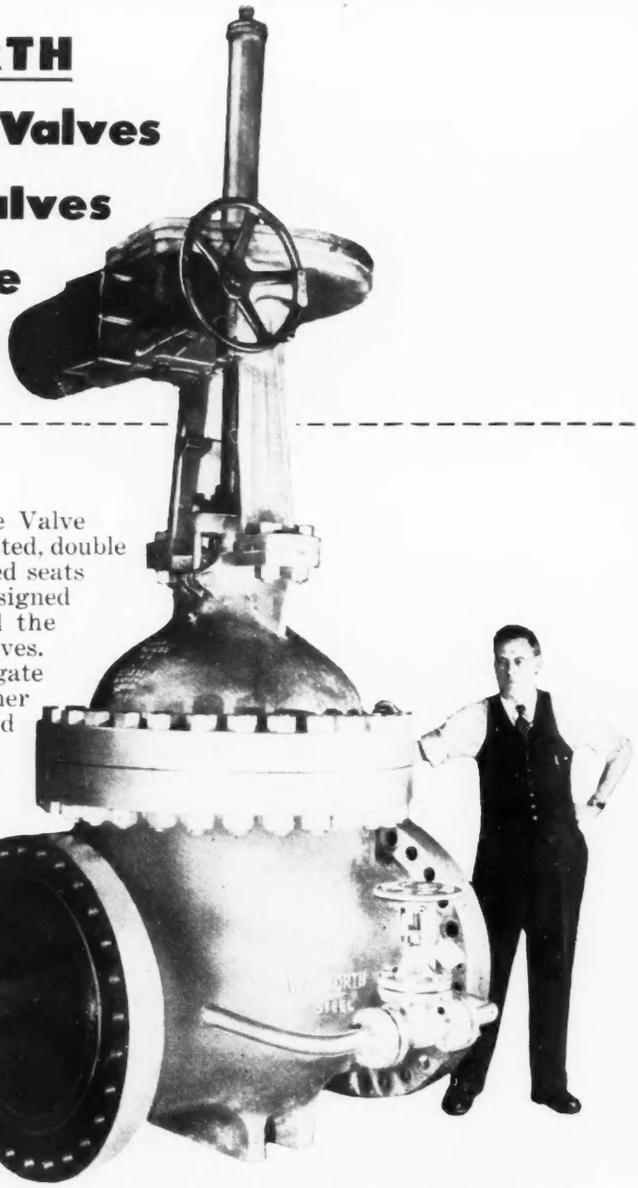
DEPARTMENT AND FIELD	WELLS COMPLETED IN 1947					WELLS DRILLING AND SHUT DOWN AT END OF 1947		
				Total				
	Oil	Gas	Dry	Wells	Footage	Drlg.	SD	Total
Bacau								
Moinesti	1			1	1,360	1		1
Buzau								
Berca	7			7	19,447	4		4
Dâmbovitza								
Bucsâni	5	1		6	14,514	1		1
Doicesti								
Glodeni								
Opâriti	2			2	5,219	2		2
Prahova								
Băicoi-Tintea-Liliesti	17	1	1	19	99,647	6		6
Boldesti-Paulesti						1		1
Bustenari-Runcu			1	1	2,956	2		2
Ceptura	6			6	27,964	3		3
Copaceni	1			1	2,411			
Ditesti	1			1	6,040	1		1
Floresti	2			2	18,177	4		4
Moreni-Gura Ocnetei, Băna	13	1		14	60,768	10		10
Piscuri	3			3	15,823	2		2
Pitigia-Drăganesa					3			
Zemes-Tâslau	1			1	1,503	3		3
Total	59	3	2	64	275,832	40		40

Oil Production in Roumanian Fields

Department and Field	Year 1946	Year 1947	Cumulative Through 1947
Bacau:			
Moinesti	96,400	394,268	3,848,168
Buzau:			
Arbanasi	155,500		
Berca	695,400	884,940	23,846,520
Sarata Monteoru	27,600		
Prahova:			
Ochiuri, Rasvad		4,049,250	
Gura, Ocnetei	12,729,700	4,632,713	
Moreni, Piscuri			629,635,100
Ghirdoveni			
Filipesti	1,208,200	4,850,767	
Margineni	240,000		
Baicoi, Tintea, Liliesti	6,924,800	6,865,658	114,946,458
Floresti	528,400		
Boldesti, Harsa, Paulesti	3,438,900	3,132,165	110,166,665
Ceptura, Urlati	3,077,500	2,955,623	66,988,823
Other Prahova and Dambovita Fields	2,341,800	1,007,250	223,378,634
Total	31,464,200	28,772,634	1,172,810,368

WALWORTH

manufactures both Gate Valves and Lubricated Plug Valves for pipe line service



The Walworth 26-inch Series 600 Cast Steel Gate Valve shown here is for pipe line service. It is a motor operated, double disc, parallel seat type of gate valve with hard faced seats and discs; flanges faced and drilled. The valve is designed for 1200 psi working pressure — and meets all the requirements of API Standard 6-D for Pipe Line Valves.

In addition to motor operated valves, pipe line gate valves are available for handwheel operation, either direct or through single or double enclosed beveled gears.

Walworth Pipe Line Gate Valves are handling crude oil, fuel oil, gasoline, and other petroleum products in many of the most important pipe lines of the world.

In addition to double disc cast steel pipe line gate valves, another popular valve for pipe line service is the Walworth Lubricated Plug Valve.

Illustrated is a Walworth 26 by 24-inch Lubricated Plug Valve for 960 pounds working pressure, with a high pressure cylinder for use in conjunction with automatic valve control. Manufactured for service on a natural gas pipe line.

- Made of cast steel and conforms to API Standard 6-D for Pipe Line Valves.
- Roller bearings permit easier opening under pressure.
- Tight sealing — resistant to wear and corrosion — dead tight shut-off — pressure sealed.

For further information regarding either Gate Valves or Lubricated Plug Valves for Pipe Line service, see your nearby Walworth distributor, or write to Walworth Company, General Offices, 60 East 42nd Street, New York 17, N. Y.

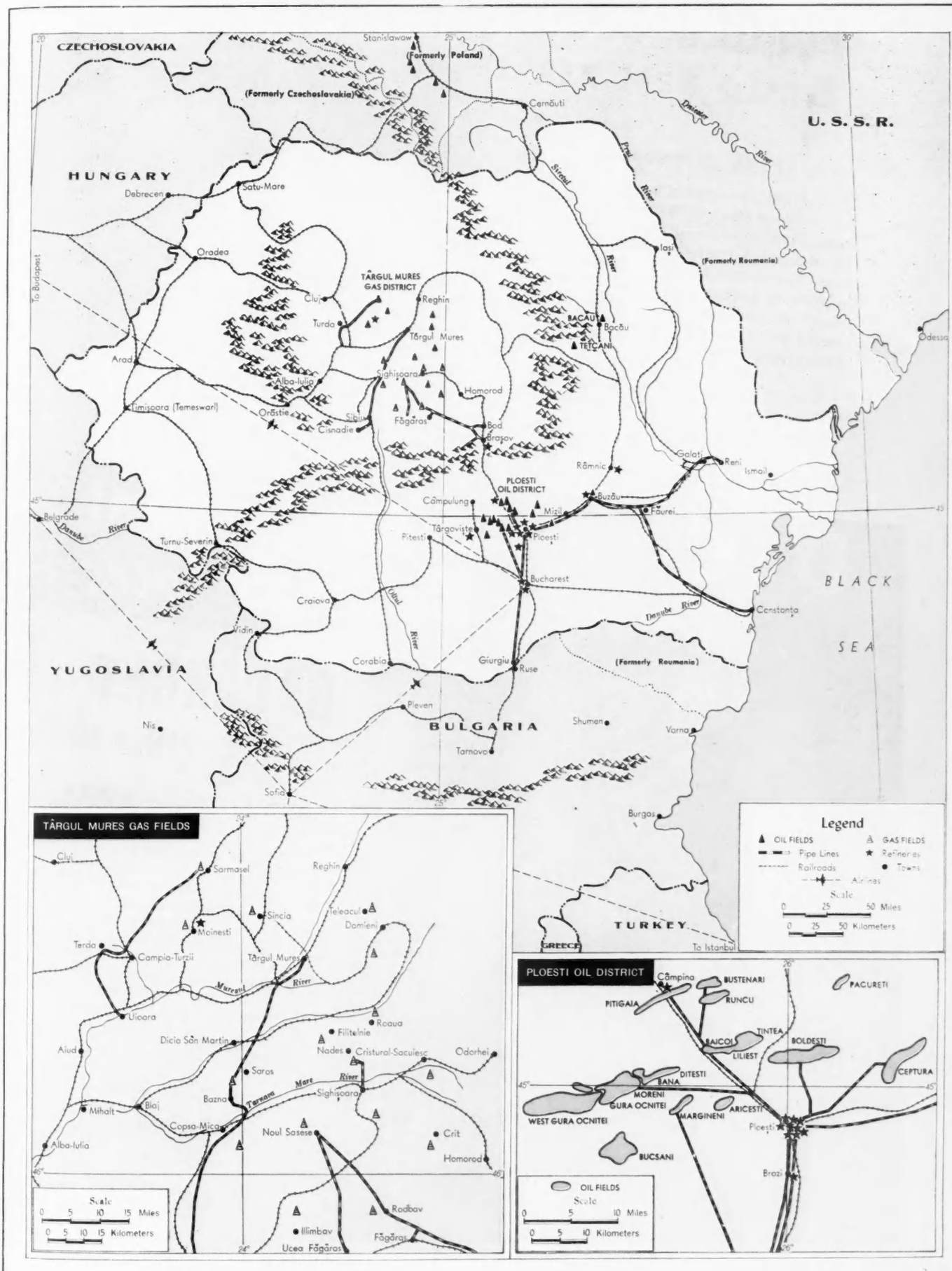
WALWORTH

valves and fittings

60 EAST 42nd STREET NEW YORK 17, N.Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

ROUMANIA—Ploesti and Targul Mures Fields

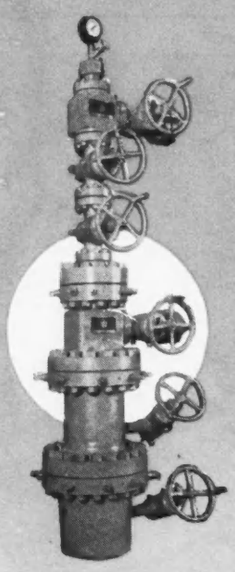


FORGED STEEL
DeCo WELL HEADS

FOR EXTRA DEPENDABILITY

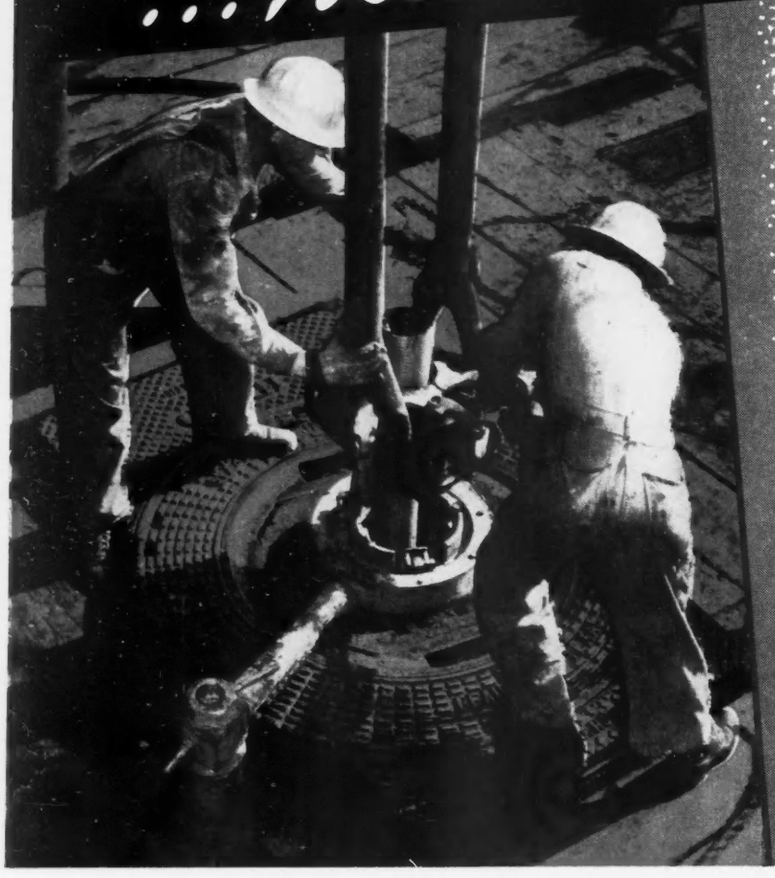
The Delaney Company has long been noted for its "know how" in the field of metallurgy. From engineering to final machining, DeCo High Pressure Well Head Equipment is produced to meet any condition relative to pressure control. DeCo Well Heads are forged for your protection . . . forged with fine shop equipment, manned by experienced personnel. Depend on DeCo . . . for better field service.

Combat corrosion in flowing wells with a DeCo Stainless Steel Lined, Forged Steel Tubing Head . . .



Deco Field Equipment sold thru leading supply companies.

DeCo Field Equipment
. . . Assures Better Service



BALANCED
DeCo POWER SLIPS

FOR SPEED . . . SAFETY . . . ECONOMY

Balanced operating pistons equalize weight distribution, assure perfect centering . . . minimize number of working parts for simplicity of operation and less service requirements . . . Faster, better coordinated round trips are obtainable through the driller's control of slips with elevator and brake settings by means of a single alternately operated air pressure valve at the driller's position.

DECO DELANEY
THE DeLANEY CO.
HOUSTON·9·TEXAS

6119 E. Montgomery Rd.
Houston, Texas
Phone Melrose 3-3633

ROUMANIA—Continued

The exploration program is designed to cover a wide area, and at the end of the year nine wildcats were drilling in districts ranging from outlying areas of the main fields to the Banat, near Timisoara, Moldova, and to the western plains. The exploration is sponsored largely by the government, while private operators are carrying out a limited amount of geological work in and around fields, but these have resulted in no outstanding developments.

The program drawn up by the Commission for Economic Reconstruction as a goal for 1948 activity calls for drilling approximately 210 wells, of which 60 would be wildcats. This schedule will be very difficult to attain unless materials become more available. The schedule would more than triple the number of wells drilled in 1947.

Additional difficulties ahead for the development program are seen by the general state of economic conditions in Roumania. Reports from that area show that these conditions have deteriorated greatly during 1947. Government controls have been extended to practically all phases of business activity. Low crude oil prices fixed by the authorities, together with increased demands from labor for higher wages and other benefits in the form of food, clothing and fuel have depleted considerably the financial resources of the companies. There has also been a drop in labor efficiency and discipline during 1947.

Data on Refineries in Roumania

COMPANY	Location of Plant	Crude Charging Capacity (Barrels Daily)	Cracking Capacity (Barrels Daily)	Type of Refinery	Operating Status
Astra Romana S.A. (Dutch-Shell)	Ploesti-Sud	25,000	12,000	Complete	Operating
Colombia Societe Franco-Rumanine de Petrole	Ploesti-Sud	17,000	3,300	Skim-Crk.	Operating
Concordia Soci te Anonyme Rumaine pour l'Industrie du Petrole	Ploesti-Nord.	25,000	4,700	Skim.-Crk.	Operating
Creditul Miniere S.A. Rumaine	Brazi	10,600	3,500	Complete	Operating
Dacia Romano Pet. Synd. Ltd.	Ploesti-Nord.	2,650	.....	Skim.	Operating
"Petrol Block" Societe Anonima Romana	Ploesti	11,600	4,700	Skim.-Crk.	Operating
"Photogen" Rafineria de Petrol, S.A. (Socony-Vacuum)	Ploesti-Nord.	3,500	.....	Skim.	Operating
"Unirea" Societate Anonima Romanada Petrole (Phoenix)	Ploesti	12,800	3,250	Skim.-Crk.	Operating
Romano Americana S.A. (Std. of Jersey)	Ploesti	24,200	7,900	Skim.-Crk.	Operating
Steau Romana S.A.	Moinesti	7,000	.....	Skim.	Operating
	Campina	6,500	.....	Skim.	Operating
Intr. Niculescu Ciufu	Targaviste	150	.....	Skim.	Operating
B. Blum	Margineni	300	.....	Skim.	Operating
Prahova (Petrolul Bucarest)	Bucarest	3,600	.....	Skim.	Operating
Xenia	Ploesti	4,500	.....	Skim.	Operating
Astramina	Ploesti	1,400	.....	Skim.	Operating
Est. Petrol	Ploesti	850	.....	Skim.	Operating
Resnov	Ploesti	300	.....	Skim.	Operating
David Ciurea	Ploesti	100	.....	Skim.	Operating
Luceafarul	Ploesti	100	.....	Skim.	Operating
Revcil	Ploesti	300	.....	Skim.	Operating
Apollon Petrol	Ploesti	400	.....	Skim.	Operating
Petrocarbon	Ploesti	500	.....	Skim.	Operating
Major O. Pelin	Ploesti	100	.....	Skim.	Operating
Total	24 Plants	157,850	39,350	.....	.....

Geological Data on Roumanian Fields

Province and Field	Gravity of Oil	PRODUCING FORMATION		
		Local Name	Kind	Geologic Age
Prahova:				
Moreni-Gura Ocnitei	33	Dacic, Meotic, Helvetian	Sand	Pliocene, Miocene
Filipesti de Padura	43	Meotic	Sand	Pliocene
Margineni	39	Meotic, Sarmatian	Sand	Miocene
Ariceşti	35	Meotic	Sand	Pliocene
Campina	41	Meotic	Sand	Pliocene
Pitigaia-Dragauneasa	36	Helvetian	Sand	Miocene
Bustanari-Runcu	42	Meotic, Helvetian, Oligocene	Sand	Pliocene, Miocene, Oligocene
Floresti		Meotic	Sand	Pliocene
Băicoi-Tintea-Liliesti	39	Dacic, Meotic	Sand	Pliocene
Boldesti-Păulesti	37	Meotic	Sand	Pliocene
Scaiosi	40	Meotic	Sand	Pliocene
Malaesti-Magurale	32	Meotic	Sand	Pliocene
Copaceni	41	Meotic	Sand	Pliocene
Matita-Atarnati	42	Meotic	Sand	Pliocene
Ceptura	34	Meotic	Sand	Pliocene
Zemes-Tazlau	43	Oligocene	Sand	Oligocene
Stanesti-Solorti	43	Oligocene	Sand	Oligocene
Tescausi	43	Helvetian	Sand	Miocene
Dâmbovita:				
Mahil-Rosu	37	Sarmatian	Sand	Miocene
Bucsani	38	Meotic	Sand	Pliocene
Doicesti	39	Meotic	Sand	Pliocene
Glodeni	38	Meotic	Sand	Pliocene
Bazau:				
Arbanasi	39	Meotic	Sand	Pliocene
Berca		Meotic	Sand	Pliocene
Sarata Monteoru	38	Meotic	Sand	Pliocene
Bacau:				
Moinesti	43	Meotic, Oligocene, Eocene	Sand	Pliocene, Oligocene, Eocene

SPAIN

WITH increased restrictions on use of products, Spain is intensifying its efforts to develop its own sources. Its first wildcat, in the Oliana area, is being drilled by Compania Espanola de Petroleos Scientificas Investigaciones, a company owned half by Socony-Vacuum Oil Company and half by local capital. Scheduled to go to 8000 feet, it was near that depth early in 1948. Other prospecting is going on in the vicinity of Burgos. Refineries are located at Barcelona and at Cartagena with capacities of 600 and 10,000 barrels respectively, both shut down, while a 12,000-barrel plant owned by Compania Espanola de Petroleo in the Canary Islands is operating. Spain also plans a plant for producing synthetics.

SWEDEN

ALTHOUGH Sweden has never found petroleum in commercial quantities, it has extensive deposits of oil shales, exploited since 1923 when its first test plant was built at Kinnekulle. Production is now more than a million barrels a year. Most deposits are in the provinces of Närke, Västergöland and Östergötland, as well as the island of Öland, but the Närke area is the most suitable.

Some drilling for oil has been done and it was reported that showings had been found near Hoellviken.

TRIESTE

TRIESTE's only petroleum properties are refining. The largest plant, owned by "Aquila" S. A. Tecnico-Industriale, has been rebuilt with a 9000-barrel capacity. A 2500-barrel plant of Societa Americana del Petroleo, is shut down.

YUGOSLAVIA

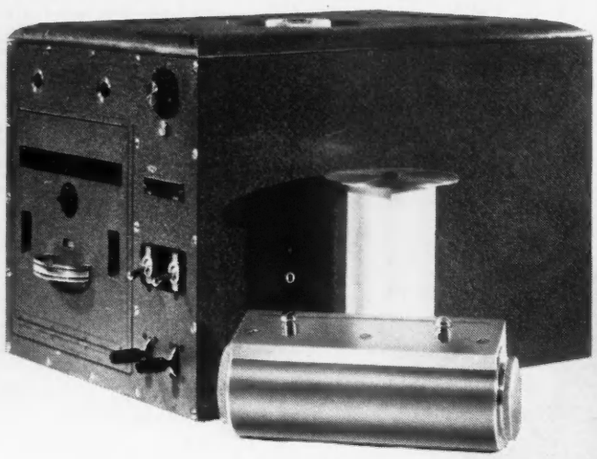
THE Yugoslav oil and gas industry, nationalized during the early part of 1947, recently reported it has more than fulfilled its goal under the Five-Year Plan announced by Marshal Tito. The plan called for a production of 3,150,000 barrels during 1951, but gave no intermediate goals. Best estimates for 1947 were that output amounted to an average of 1000 barrels daily. This would necessitate vast expansion before the country is to meet its 1951 goal. Most of the oil comes from the Peklenco-Selencia region where 4000-4200-foot production was discovered during the German occupation and which made possible the peak output of 2000 barrels daily during 1944. The decline since that does not indicate any outstanding discoveries.

Refining facilities consist of five small plants with aggregate capacity of 8100 barrels daily, now largely obsolete.

NOW *Available* — EQUIPMENT BY COLEMAN

GEOPHYSICAL EQUIPMENT

Multi-channel Oscillographs, 6-inch to 10-inch paper widths. Single or multi-channel Galvanometers for special applications. Electro, magnetically-damped Geophones.



In addition to the products we manufacture and sell, we offer complete engineering and production facilities for electrical and mechanical instruments and equipment. We can carry your ideas through design, engineering and production. Your inquiries are invited.

TESTING AND MEASURING EQUIPMENT FOR PRODUCTION AND ANALYSIS OF PETROLEUM

(Manufactured under agreement with Gulf Research and Development Corp.)

- Bottom Hole Pressure Gauges.
- Bottom Hole Pressure Samplers.
- High Pressure Transfer Bombs.
- Hand operated or motor driven high pressure Mercury Pumps.
- Dead Weight Testers — from 25 lbs. p.s.i. to 10,000 lbs. p.s.i.
- Gasometers.
- High pressure single and multiple needle Block Valves.
- Kemler well-weighing Strain Gauges.
- Sonic fluid level Recording Instruments.
- Pressure Volume Cells.
- Combined PVT Units.

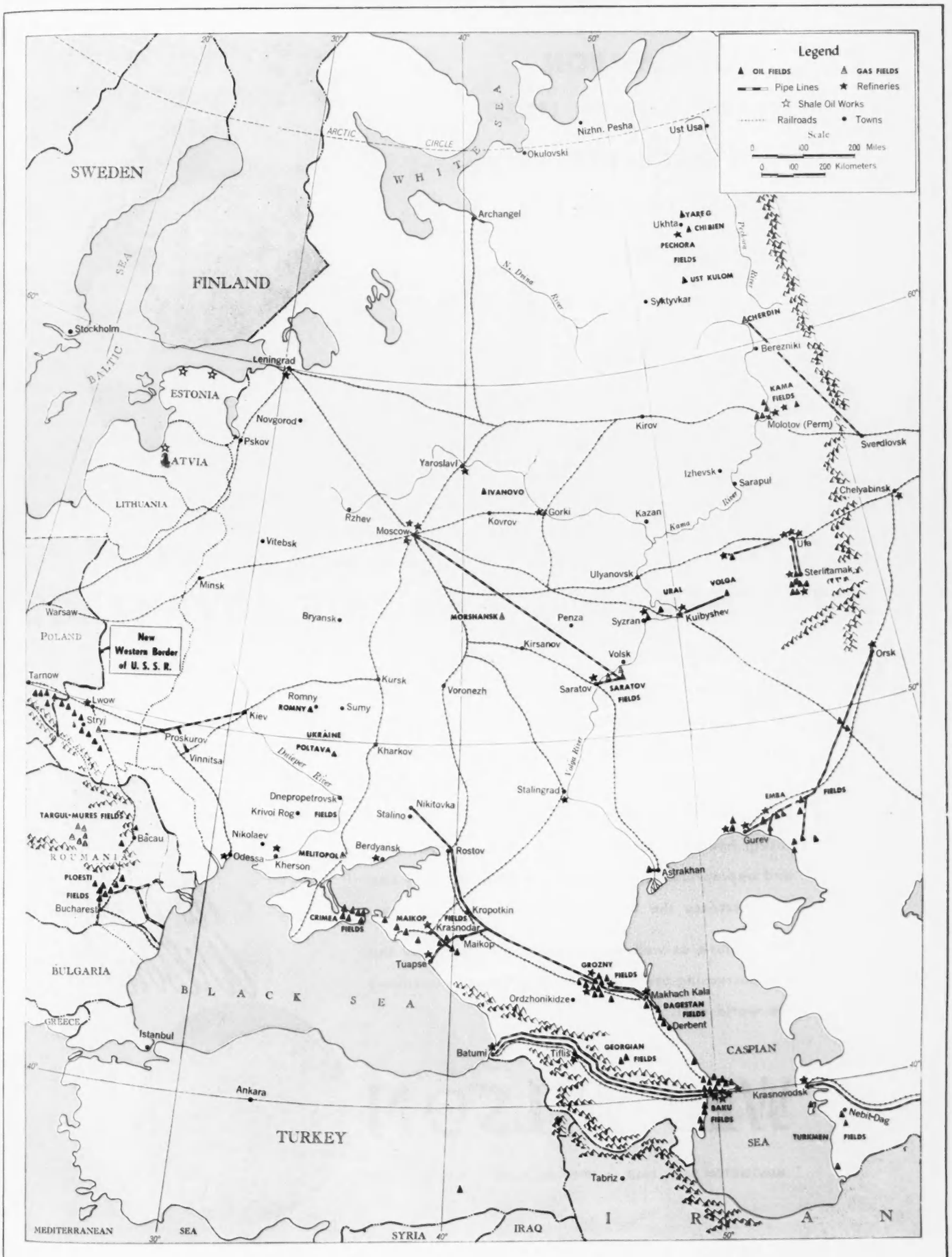
COLEMAN INSTRUMENT

and Manufacturing Company

Specializing in Geophysical and Technical Instruments

716 SOUTH TROOST **TULSA, OKLAHOMA**

U. S. S. R.—European Area



WEB WILSON TONGS CAN BE USED FOR DRILL PIPE OR CASING BY MERELY CHANGING JAWS

NO OTHER TONG HAS THIS ADVANTAGE

WEB WILSON Tongs are the most versatile tongs available today. THEY CAN BE CHANGED FROM DRILL PIPE TO CASING BY MERELY CHANGING JAWS. This change is accomplished by changing the long jaw and short jaw and using the appropriate lug jaw. The casing head consists of the long jaw, short jaw, latch and appropriate lug jaw to fit the desired casing size and increases the tong range to 19-5/8" diameter.

This feature, as well as many others, accounts for the ever-increasing use of WEB WILSON Tongs by operators the world over.

WEB WILSON TONGS
Type AAX for Extra-Heavy Duty
Type B for Medium Duty
Type C for Light Duty

It's a Wilson!

WEB WILSON

Oil Tools INCORPORATED

HUNTINGTON PARK, CALIF. • HOUSTON, TEXAS • NEW YORK CITY

U. S. S. R.

THE available information on Soviet Russia's petroleum industry now points to a definite increase in production during 1947, with prospects for further increases during succeeding years. There are still no official figures on actual production and development, but enough information has been obtained by interested observers to indicate that 1947 petroleum output for Russia rose nearly five percent from the 1946 output to a daily average for the year of 471,233 barrels, exclusive of Sakhalin, which produced 18,630 barrels a day. Despite the fact that both Russian news sources and those of various intelligence services agree that substantial increases have been registered over the war years, there is also general agreement that these increases have not been sufficient to take care of the nation's needs, particularly in view of its ambitious industrial and agricultural plans. The Soviets are in somewhat the same position as the United States and others in that they too are plagued by shortages of critical materials, and under political circumstances such as have existed for the past couple of years it is doubtful that they will continue to receive any appreciable amounts of oil country goods from the United States.

The goal of indigenous production for 1950, the last year of the current Five-Year Plan, is approximately 725,000 barrels daily. Despite the increases registered in 1946 and 1947 over the low points reached during the war, it is doubtful that such a goal can be attained without generous quantities of materials, and most efficient use of technical skills in exploration, development, transportation and refining. Late in 1947, *Pravda*, the Communist newspaper, said oil-field workers had pledged to reach the goal in four years instead of five, or in 1949. This would necessitate increasing 1947 production by 48 percent within the next two years, a monumental task in view of the difficulties.

At this time, when grave concern is being felt over the ability of the producing, transportation and refining units of the world petroleum industry to meet growing demand, the question of Russia's part in this is the subject of much discussion. In the opinion of many of the industry's top economists and technicians the U.S.S.R. has potentialities of eventually discovering more reserves of petroleum than exist in the United States, the top producing nation of the world. It is also well known, from information available before World War II, that countless prospects have been discovered, many of which should eventually become commercial producers. However, it is estimated that discovered recoverable reserve of Russia now stands at between 7½ and 8 billion barrels, a very low figure when taking account of the fact that Russia has been a producer of oil for about the same length of time as the United States, during which time the United

Crude Oil Production in European U.S.S.R.

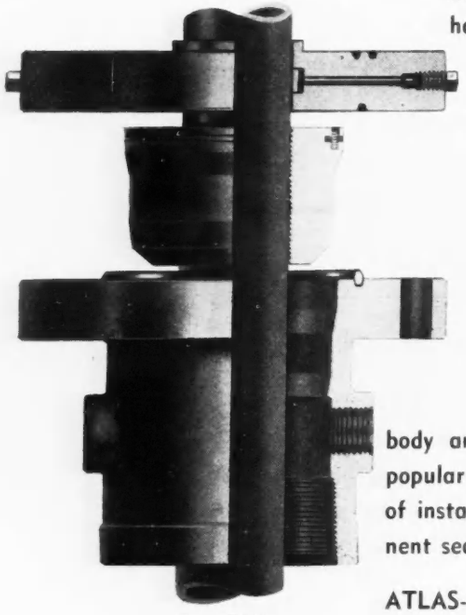
(Latest Available Data)

Region and Field	Year of Discovery	Gravity of Oil (A.P.I.)	PRODUCTION (Barrels) 1939 Actual	1944 Estimated
Baku Region:				
Artem Island	1904	19–24	6,070,000	3,500,000
Bibi Eibat	1875	24–37	26,950,000	21,000,000
Binagady	1903	21–35	4,580,000	3,500,000
Kala	1932	29–41	28,785,000	28,000,000
Kara-Chkhur and Zyzh Fields	....	....	18,330,000	17,500,000
Kergez-Kyzyl Tepe and Shongar Fields	....	....	1,680,000	2,000,000
Lenin Fields (Balakhany, Sabunchy, Ramany)	1871	19–33	31,060,000	28,000,000
Lok Batan and Puta Fields	....	....	16,905,000	14,000,000
Shuraabad	1936	36	....	750,000
Siazan	1876	36	7,500	1,000,000
Surakhany	1910	29–49	19,890,000	17,500,000
Sulu Tepe, Peschanny Island, Saryncha-Guilbakht, Kara Dag, Sian Shor, Baladjary, Fatmay, Mahomedly, Shubany and others	....	....	....	7,000,000
Total Baku			154,257,500	143,750,000
Crimea Region:				
Chongelek and Others	....	....	7,500	75,000
Daghestan Region:				
Achi Su	1932	30–36	75,000	1,500,000
Izber Bash	1936	38	1,205,000	4,500,000
Kaia Kent	1932	22–32	150,000	750,000
Total Daghestan			1,430,000	6,750,000
Emba Region:				
Baichunas	1931	25–35	800,000	1,500,000
Dossor	1910	30.4	460,000	600,000
Dshaksymai	1936	32	125,000	300,000
Iskine	1933	....	855,000	1,500,000
Koschaghyl	1935	33	1,840,000	2,000,000
Kulsary	1938	....	....	350,000
Makat	1915	....	910,000	1,000,000
Munaili	....	....	....	75,000
Shobarkuduk	1938	....	135,000	350,000
Sagis, Napmundansk, Jakaymay, Novo-Bogatinsk and Chernaya-Retchka Fields	....	....	....	2,500,000
Total Emba			5,125,000	10,175,000
Grozny Region:				
Benoi	1930	41	....	750,000
Gorskaya Mountain	1936	....	2,500,000	2,000,000
Grozny, New	1913	....	5,075,000	1,750,000
Grozny, Old	1893	....	2,685,000	1,000,000
Gudermes	1939	34	....	750,000
Malgobek and Voznessenka	....	25–36	5,530,000	5,000,000
Makhkety, Sernovodsk and others	....	....	....	750,000
Total Grozny			15,800,000	12,000,000
Kama River Region:				
Gorodki	1929	21	25,000	....
Krasnokamsk, Severokamsk and Polazna Fields	....	....	560,000	2,000,000
Others	....	....	....	350,000
Total Kama River			585,000	2,350,000
Kura River Riegion:				
Nephte Chala	1926	....	380,000	700,000
Pirsagat	1936	....	720,000	1,900,000
Others	....	....	....	2,300,000
Total Kura River			1,100,000	4,900,000
Maikop Region:				
Abuzy	1938	....	790,000	350,000
Asphalt Mountain	1937	37	3,570,000	1,000,000
Keslerovo-Varenikovo, Krymasko-Kudako and Adaghum Fields	....	....	250,000	150,000
Kutaisi	1937	33	2,625,000	700,000
Maikop-Khadyzhensky	....	....	10,805,000	4,000,000
Sepsil	1939	....	....	75,000
Others	....	....	....	150,000
Total Maikop			18,040,000	6,425,000
Perchora Region:				
Ukhta, Chibien, Yareg and Ust Kulm Fields	....	....	700,000	3,500,000
South Georgian Region:				
Mirzaani, Malye Shiraki Fields	....	....	430,000	1,500,000
Ukraine Region:				
Romny Field and others	....	....	7,500	150,000
Ural-Volga Region:				
Kuibishev Area (principally Syzran and Yablonovo Fields)	....	....	1,300,000	4,000,000
Buguruslan and Tuimaza Fields	....	....	....	1,500,000
Sterlitamak Area:				
Allaguvatovo	1941	....	....	150,000
Buranchino	1939	....	....	250,000
Ishimbaevo (3 pools)	1932	29.5	11,635,000	17,500,000
Kuzminowka	1939	....	....	250,000
Smakaevo	1937	29	....	350,000
Termen-Yelga	1939	....	....	1,050,000
Others	....	....	....	150,000
Total Ural-Volga			12,935,000	25,200,000
Total European Russia			210,417,500	216,775,000

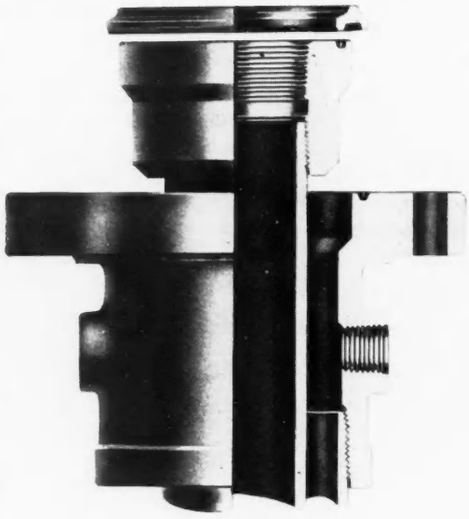
Continuous IMPROVEMENT

makes Atlas Equipment ever Popular

THE ATLAS TYPE S-W CASING HEAD was designed for the long strings of pipe and ever higher well pressures. Special attention is directed to the double taper slips. This insures perfect alignment of casing to casing head body thus eliminating the hazard of crushing the casing at the suspension point. Another feature—*A metal to metal seal throughout.* Hangers are interchangeable.



Type S-W



Type A-3

THE ATLAS TYPE A-3 SYSTEM is an all steel combination using exclusively *metal* to *metal* seal, bridging the joint between body and hanger. This seal has proven very popular with the industry, due to the simplicity of installation and a first seal being a permanent seal. Hangers are interchangeable.

ATLAS-HUGHES BALL THRUST VALVES are made from selected alloy steel, of non-rising stem, solid wedge type, with a ball-bearing stem thrust, hard-faced seating surfaces. Flanged or screwed ends. Taper and thread form in pipe connections are accurately gaged to provide absolutely tight joints. Both ends of the valve are accurately aligned.

(See Atlas section in the 1948 Composite Catalog detailing the suspension of casing nipples.)

All materials used in Atlas equipment are certified as to physical and chemical properties. The utmost care is exercised to produce high quality equipment.

Atlas-Hughes Valve

ATLAS ENGINEERING WORKS

Manufacturers of Oil Field Specialties

5206 Navigation Blvd. Houston 11, Texas

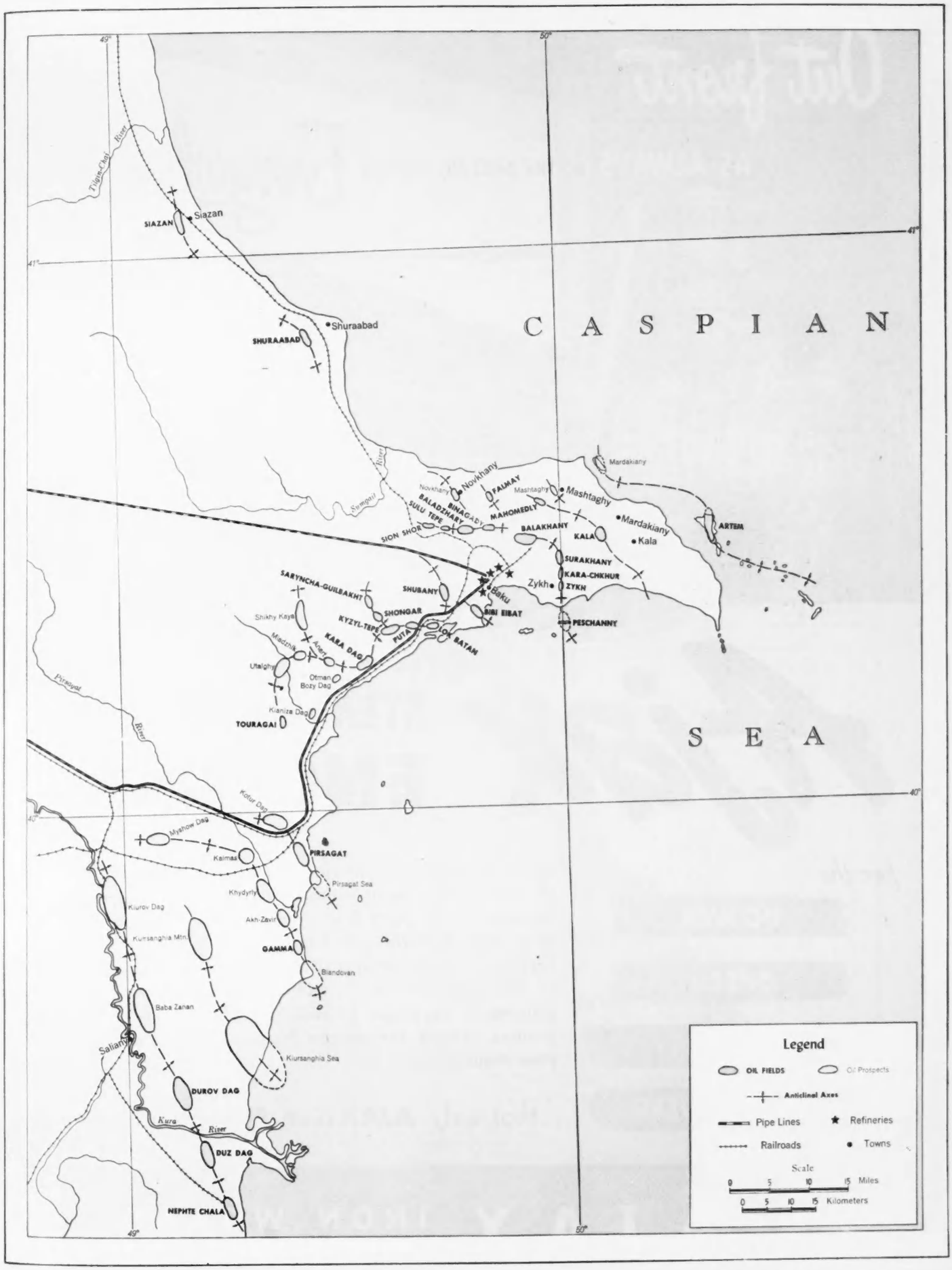
Atlas products are sold thru Supply Stores. Prices are subject to discount and may be changed without notice.

Export Sales: **PETROLEUM MACHINERY CORPORATION**

NEW YORK CITY

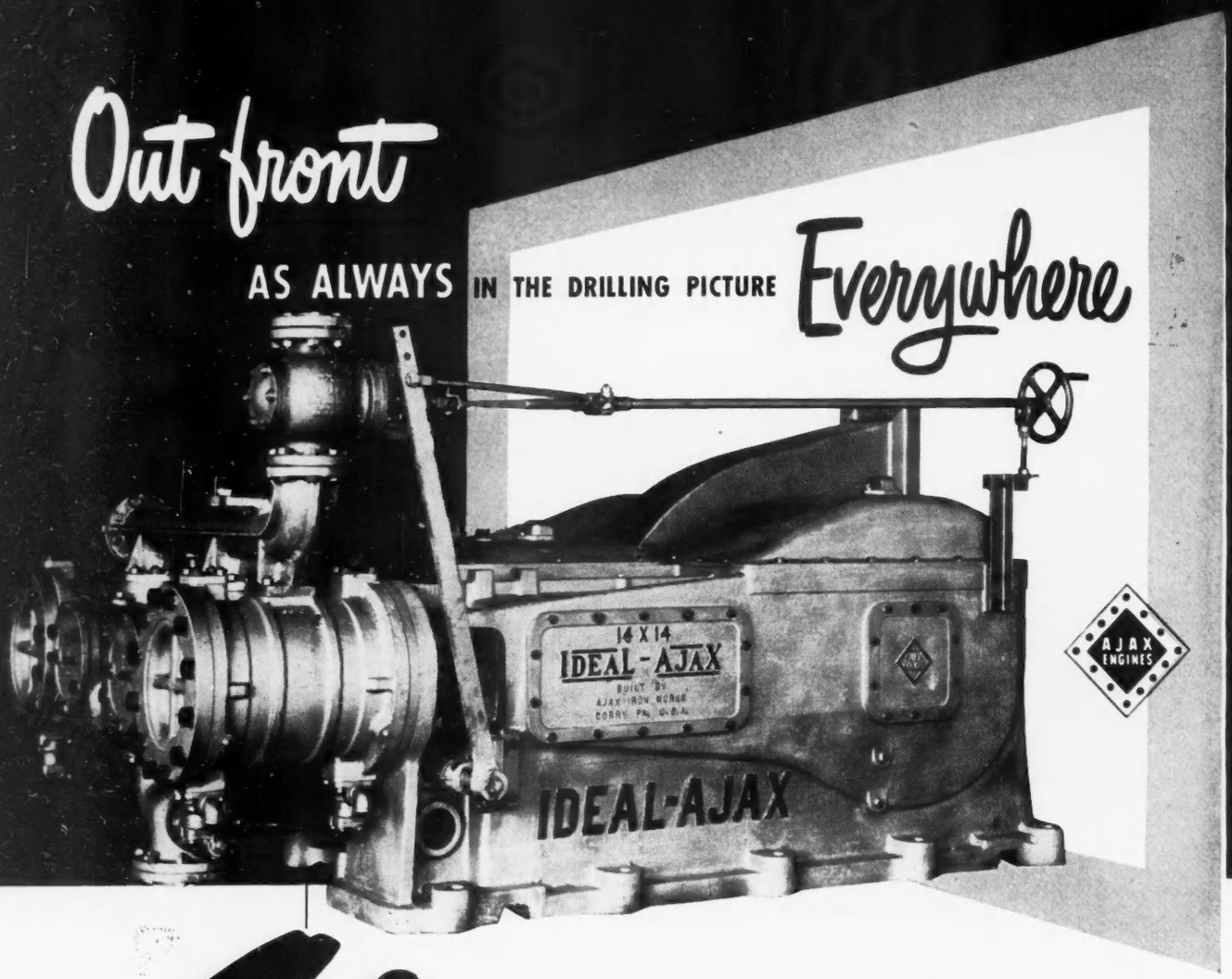
30 Rockefeller Plaza Cable Address: Petromac

U. S. S. R.—Baku (Azerbaijan) Fields and Prospects



Out front

AS ALWAYS IN THE DRILLING PICTURE *Everywhere*



Ajax STEAM DRILLING ENGINES

for the

POWER

SPEED

FLEXIBILITY

SMOOTHNESS

AJAX Steam Drilling Engines are in the forefront of the oil industry's greatest drilling program, in the Americas and abroad. In every field, operators know and depend upon these powerful prime movers for *high torque* at all speeds . . . *instant control* at all times . . . *sturdy dependability* in continuous service . . . and the *minimum maintenance* assured by simplicity of design and fine construction features. Check the nearest National Supply man on your requirements!

. . . that only ***AJAX*** *and* ***STEAM*** *can give!*

Manufactured Exclusively by

AJAX IRON WORKS
CORRY, PENNSYLVANIA

Distributed by

THE NATIONAL SUPPLY COMPANIES IN EVERY FIELD

U. S. S. R.—Continued

States has produced more than six times as much as Russia and has proved three times as much remaining reserve. It would seem that attainment of a 48 percent increase over current production within two years is unlikely in view of the record.

According to the Five-Year Plan it is to be assumed that substantial discoveries have been made in the Ural-Volga region, often referred to by the Soviets as the "Second Baku." In 1940 this area produced only six percent of Russia's total, while the Baku and Grozny regions accounted for 86 percent of the total output. The goal is for 36 percent of the 1950 total to be produced from the Ural-Volga. The Baku and Grozny regions had suffered damage during the war through occupation by the Germans and denial operations on the part of the Russians. The reports say now that much of the war devastation has been repaired, and much of the pre-war production restored. It had been reported that more than 3000 wells producing more than 36 million barrels a year had been destroyed during the war in the Grozny and Krasnodar areas.

One of the developments of the latter war years and the immediate postwar period has been the increased dependence on natural gas as a source of industrial and domestic fuel. A number of pipe lines have been constructed for bringing natural gas into the populated centers, one being a 500-mile line from Saratov to Moscow. In connection with this project a plant is being constructed for liquefying and bottling gas which is to be stored against emergencies such as line failures or sudden peak loads. In addition there has been considerable recent exploration in an effort to establish gas production in the vicinity of Moscow itself where a number of geological and geophysical prospects exist.

In an attempt at a certain amount of decentralization in order to make the oil search and development more flexible, the Soviet authorities in 1946 set up two separate commissariats for administration of the oil industry in two broad subdivisions of area. One has charge of the Southern and Western regions of European Russia, comprising the Caucasus, Ukraine and the Central areas, and the other administrating the petroleum affairs of the Eastern regions, which includes the Ural-Volga, Kama River, Far East, Kazakhstan, Uzbekistan and Turkmenia, all in Asiatic Russia.

Currently the most important producing regions of the U.S.S.R. are still the areas of the Caucasus Welt in the southern portion, which include the Baku, the Maikop, and Grozny areas, from which has come most of Russia's oil in the past, and where most of its proved reserve is thought to lie.

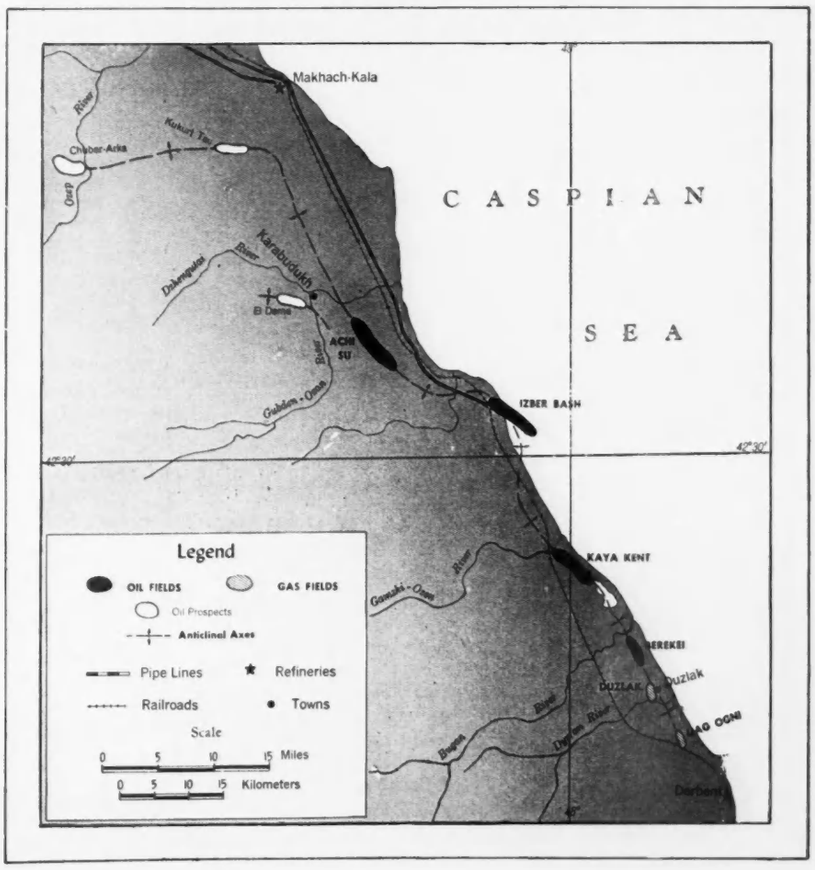
Next in order are the Sterlitamak, Emba Basin, and Kuibishev districts which make up the Ural-Volga area where the newer discoveries have been reported, all in the geologic province refered to as the Russian Platform. Importance is attached to this general area since, although some of the fields have been known to exist through preliminary drilling for many years, concentrated de-

Crude Oil Production in Asiatic U.S.S.R.
(Latest Available Data)

Region and Field	Year of Discovery	Gravity of Oil (A.P.I.)	PRODUCTION (Barrels) 1939 Actual	1944 Estimated
Bukhara-Fergana (Uzbek-Tadzik-Kirgiz) Region:				
Changirtash	1932	....	.....	1,400,000
Chimmon and Yarkutanski	....	....	85,000	200,000
Kaudag and Ueh Kyzyl	....	....	1,090,000	3,500,000
Khanabad-Sai and Nefteabad	....	....	55,000	150,000
Kim (Sel Rokho)	1909	29	170,000	250,000
Shor-su	1931	36	65,000	100,000
Mailisai, Tekebel, Tash-Pavat, Andizhan, Chu and others	....	....	.....	3,500,000
Total Bukhara-Fergana	....	....	1,465,000	9,100,000
Eastern Siberia:				
Maya Field	1944	....	.....	75,000
Kamkatcha Region:	....	....	.....	375,000
Sakhalin Region:*				
Katangli	....	....	130,000	6,000,000
Okha-Ekhabi	1889	15–26	3,320,000	
Total Sakhalin	....	....	3,450,000	6,000,000
Turkmen Region:				
Neftedag	1931	....	3,455,000	4,000,000
Cheleken, Nebit-Dag, Boyadag, Syrt-Dali, Menzh Ukli, Cheekishlyar, Keimir, Mangshlak, Djar Kurgen, Gaurlak and Karans Fields	....	....	.....	2,750,000
Total Turkmen	....	....	3,455,000	6,750,000
Yenisei-Khatanga Region:				
Nordvik, Hozhenvnikovo and Lilya Fields	....	....	.....	1,500,000
Total Asiatic U.S.S.R.	....	....	8,370,000	23,800,000

* Exclusive of Japanese production of about 635,000 barrels in 1939.

Daghestan Fields and Prospects



JERGUSON GAGE & VALVE CO.

113 Fellsway, Somerville 45, Mass.

Manufacturers of Engineering Specialties Since 1913

JERGUSON

REPRESENTATIVES IN MAJOR CITIES WITH PHONES LISTED UNDER JERGUSON

LIQUID LEVEL GAGES: Reflex, Transparent, Tubular, Distant Reading, Heated, Cooled, Vacuum Jacketed, Frost Preventing and High Pressure. LIQUID LEVEL GAGE VALVES: Standard, Offset and Jacketed. WATER COLUMNS, TRI-COCKS, GAGE ILLUMINATORS, SIGHT GLASSES, SPECIAL DESIGN Sight Glasses, Retort Gages, Bombs, etc., made to fit individual requirements.

REFLEX GAGES (Liquid Shows Black). An easy-to-see, accurate liquid level reading gage. Liquid shows black with a sharp, clear line showing the level, contrasting with a bright, mirror-like appearance in empty space above. Covers made of heat treated forged alloy steel in high pressure groups; certified malleable iron castings in low pressure group. Glasses of Pyrex with molded prisms. Available with polished end stems for replacing tubular glass. Complete range of standard sizes for pressures up to 3200 lbs. @ 100° F.

TRANSPARENT GAGES. Used for accurate liquid level reading where color and density of liquid must also be noted. Simple and rugged . . . will give long, satisfactory service on new equipment or as replacements for old-style tubular glass gages, for which they are available with polished end stems. Complete range of standard sizes for pressures up to 2000 lbs. @ 100° F.

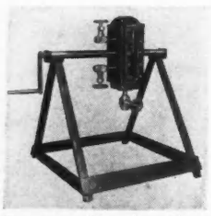
TUBULAR GLASS GAGES. Improvement on conventional design because better protected and has special stuffing box feature to prevent torsional stress on glass. Fitted with Jerguson Valves.

SPECIAL GAGES. Heated and Cooled Gages for use where liquid must be kept hot or cool for accurate reading of level. Vacuum Jacketed Frost Preventing Gages. High Pressure Gages available for use under extremely high pressures; being tested up to 20,000 lbs. working pressure. Engineering and building of special gages and valves to meet specific problems.

GAGE VALVES. Exceptionally complete line of gage valves . . . standard, offset and jacketed. All have union connection to vessel; available in plain or quick closing; convertible from plain to quick closing; ball pushers. Drain connections ¼", ⅜" or ½" at no extra charge. Variety of different tank connections on special order. Valve #64, illustrated, has union connection to gage; the gage can be turned at any desired angle and can be easily removed without removing valves or draining liquid from vessel.

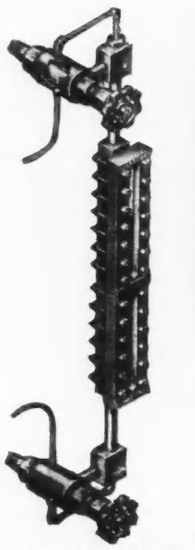
GAGE ILLUMINATORS. New wedge light principle with Plexiglass construction assures even diffusion of light through gage glass. Available in explosion proof construction.

Gage Illuminator installed on back of Trulevel Distant Reading Boiler Water Gage

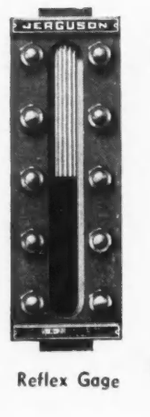


Reaction Chamber Gage

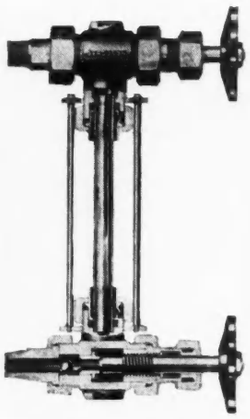
REACTION CHAMBER GAGES. With this unit the gage chamber acts as a reaction chamber which is capable of withstanding pressures up to 1,000 lbs. The charge can be agitated to test mixing qualities under various pressure and temperature conditions, before and after samples being taken from the outlets. A great many Jerguson



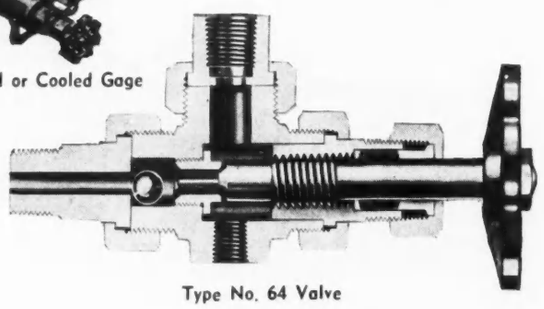
Heated or Cooled Gage



Reflex Gage



Tubular Glass Gage



Type No. 64 Valve

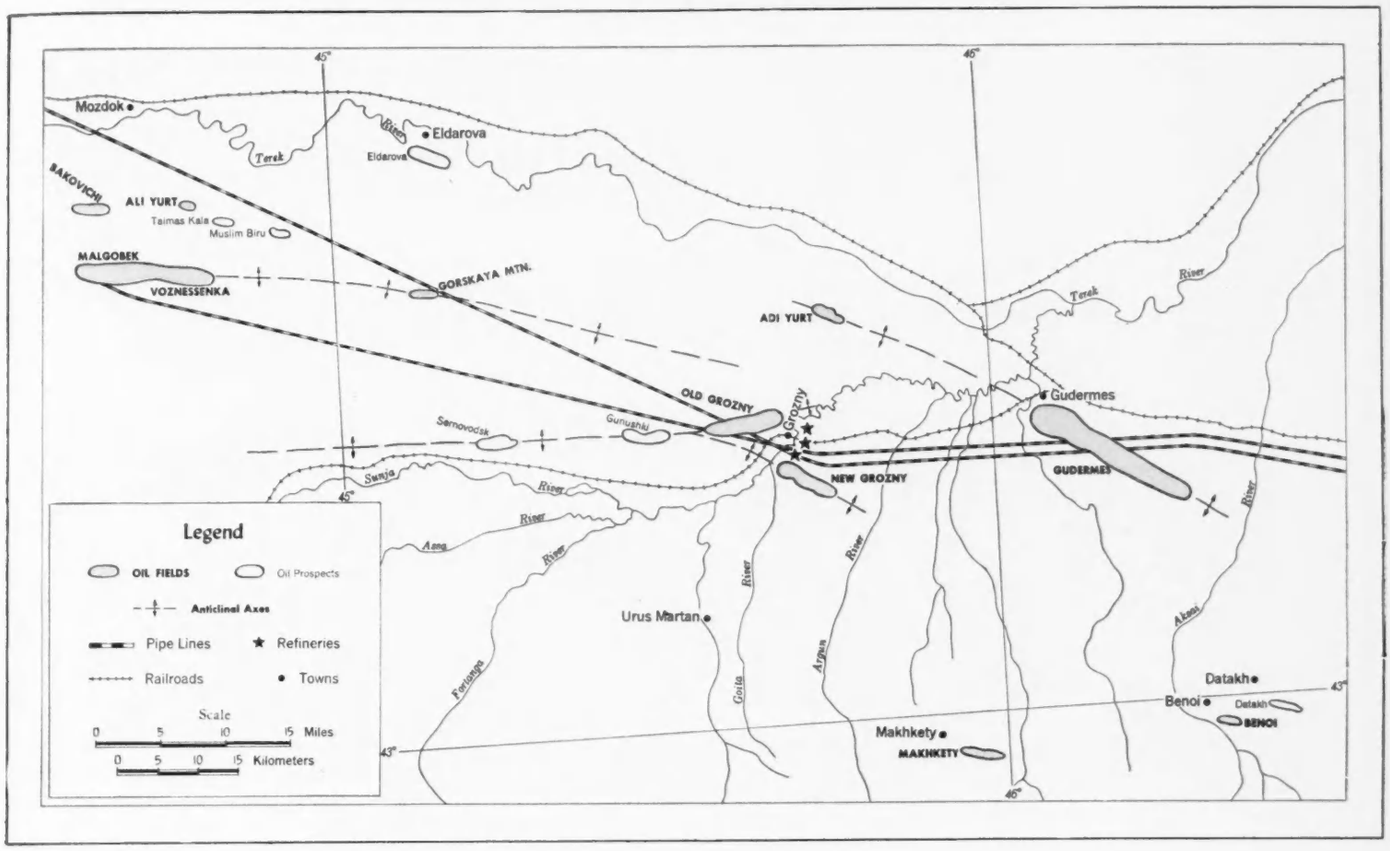
Reaction Chamber Gages have been designed and built for special applications. We shall be glad to work with you to design and build Reaction Chamber Gages to meet your needs.

FLANGED END GAGES. Where safety measures require the elimination of all threaded connections, all standard Jerguson Reflex and Transparent Gages, as well as valves, are available with flanged end connections. Gages may have flanged top, side or back connection.

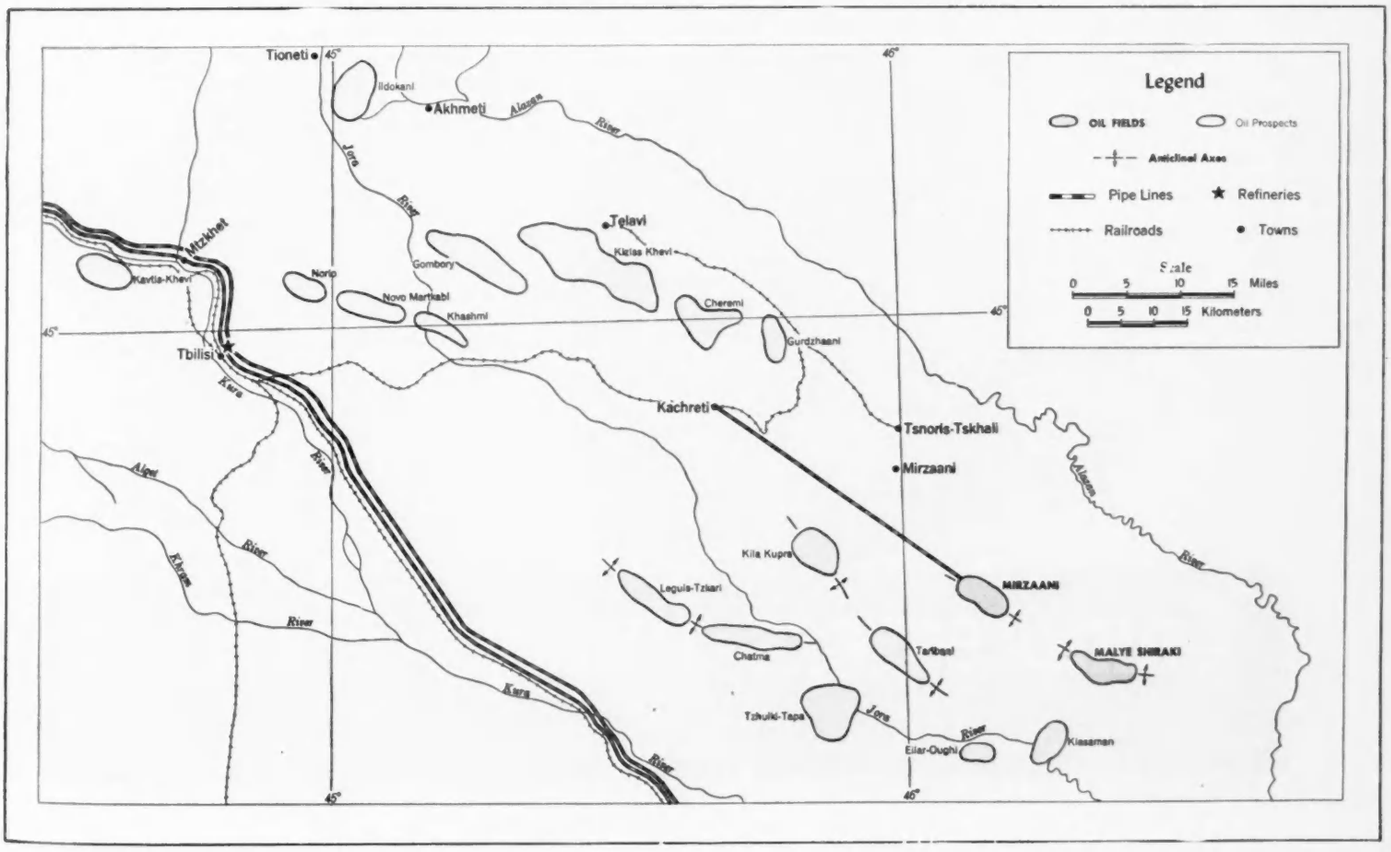
TRULEVEL GAGES. The only distant reading gage which can be quickly and easily checked at distant reading point. By simply turning two valve handles on cover it is possible to check gage accuracy in a matter of seconds. Positive accuracy of reading with new type of datum column located at drum. Sizes for all pressures.

Ask for detailed Data Units on any Jerguson products, or write to us for engineering suggestions and assistance in the application of standard Jerguson gages and valves or the development of special gages and valves to meet your problems.

U. S. S. R.—Grozny Fields and Prospects



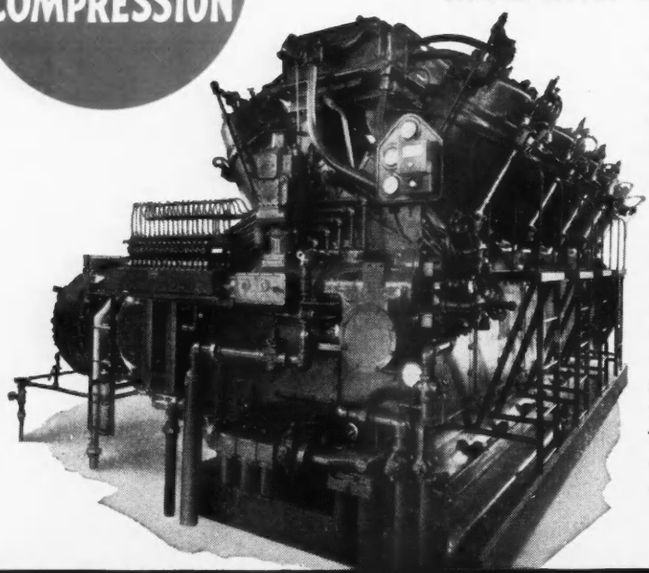
South Georgian Fields and Prospects



PLANNED BY Cooper-Bessemer *to save you money...*

IN GAS COMPRESSION

MODERN V-ANGLE COMPRESSORS

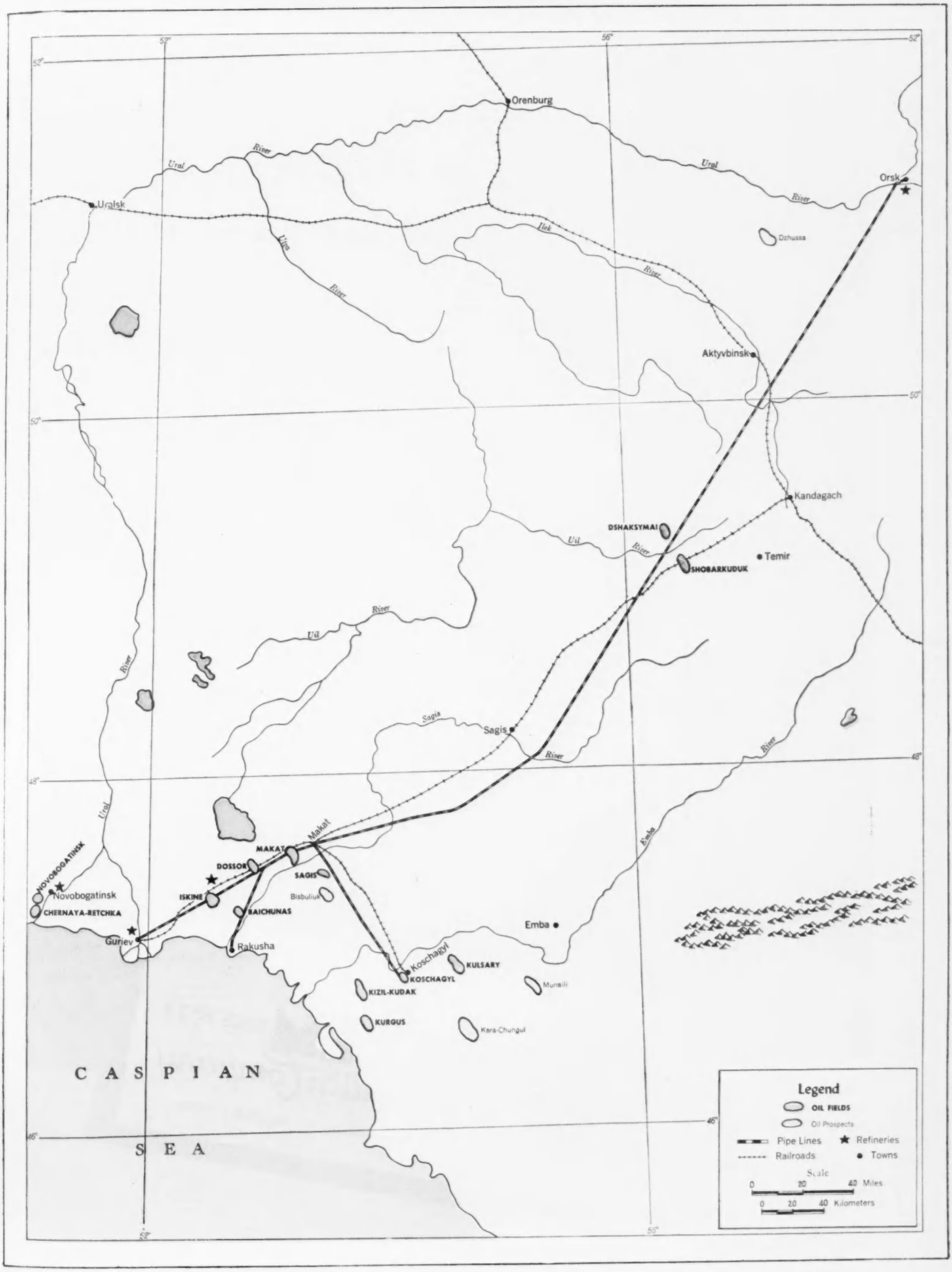


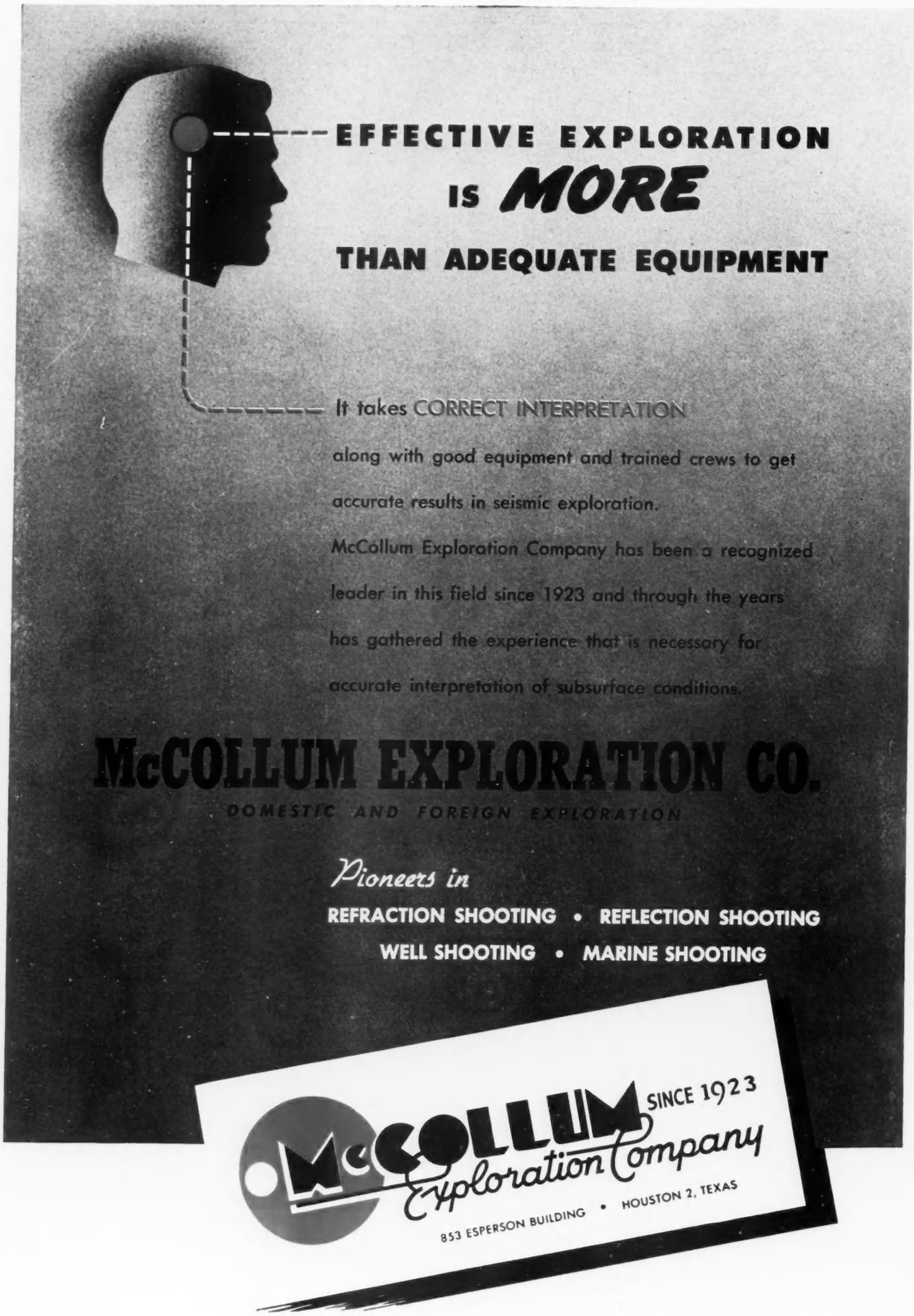
These Cooper-Bessemer 2-cycle units are available in three types: the GMX, 200 to 400 hp; the GMV, 400 to 1000 hp; and the GMW, largest angle compressor ever offered to industry, 1440 to 2400 hp. All share these proved advantages: (1) unusually low space-to-power ratio, to save you money in installation and housing costs, (2) exceptional over-all efficiency for exceptional economy in fuel and lube oil consumption, and (3) rugged, precision-built and interchangeable parts throughout, for long life, prolonged on-stream performance, and low-cost maintenance. Basically, these are the reasons why modern Cooper-Bessemer V-angles are used in so many carefully planned operations today.

Compressors · Pumps · Engines

New York Washington Bradford, Pa. Parkersburg, W. Va. San Francisco, Cal. Seattle, Wash.

U. S. S. R.—Emba Basin Fields and Prospects




EFFECTIVE EXPLORATION
IS MORE
THAN ADEQUATE EQUIPMENT
It takes CORRECT INTERPRETATION
along with good equipment and trained crews to get
accurate results in seismic exploration.
McCollum Exploration Company has been a recognized
leader in this field since 1923 and through the years
has gathered the experience that is necessary for
accurate interpretation of subsurface conditions.
McCOLLUM EXPLORATION CO.
DOMESTIC AND FOREIGN EXPLORATION
Pioneers in
REFRACTION SHOOTING • REFLECTION SHOOTING
WELL SHOOTING • MARINE SHOOTING
McCOLLUM SINCE 1923
Exploration Company
853 ESPERSON BUILDING • HOUSTON 2, TEXAS

U. S. S. R.—Continued

velopment was not attempted until 1937 or 1938 in most of them. The early results were most encouraging, and a spur to additional continued drilling which should have lifted its potential considerably in recent years. Lack of new and modern equipment is said to have hampered development seriously, but much equipment has been obtained since the war, through import, manufacture and through acquisition of certain amounts of material from some of the conquered areas of Eastern and Central Europe.

The Tuimaza field, one of the newer fields in the Sterlitamak area was discovered just before the start of the war. Development was slow during the war, but it had been reported as producing at rates of 1000 barrels daily per well and higher during recent years, and its importance is pointed up by its goal of more than 70,000 barrels a day by 1950. As do most of the fields in the Ural-Volga region, this field produces from the Carboniferous zones. In most areas the upper zones yield heavy and the lower zones light oils. Later discovery has been made of oil in the Devonian at depths below 9500 feet. The Devonian has been found to extend over a wide area of many thousand square miles on the Russian Platform, and much hope is held for ultimate recovery from the formation as complete development is attained in the various fields.

In the Baku area of the Caucasus Welt, which comprises most of the Apsheron Peninsula projecting into the Caspian Sea, oil exploitation has been carried out since as early as 1871, when the Lenin field was discovered. It is by far the most important single area in the Soviet Union, having produced from 70 to 73 percent of Russian total output through most of the recent years. It is an area of thick sedimentary sections, there having been found 15,000 feet of sediments in the Tertiary alone. Most of the fields produce from multiple sand sections, several having as many as 15 to 18 producing zones. A number of the fields have a cumulative production of more than 100 million barrels each, at least two have produced in the neighborhood of 500 million barrels, and the Lenin field, oldest of the group, has accounted for more than 1½ billion barrels. It is still producing nearly one-third of the oil from the Baku area.

No other area approaches in volume the production from the Baku, but Grozny ranks second as a total producer through the years, having produced just under three quarters of a billion barrels since the first of its fields started producing in 1893 from drilled wells. It has been estimated that prior to that time more than 50,000,000 barrels of oil were produced

Oil Pipe Lines in U.S.S.R.

Origin	Terminus	Length (Miles)	Diameter (Inches)	Year Completed
Baku Area:				
Baku fields	Batumi on Black Sea	510	10	1928
Baku fields	Batumi	550	8	1905
Dagestan Area:				
Izber Bash field	Makhach-Kala	40	8	1939
Emba Area:				
Guriev on Caspian Sea	Orsk	525	12	1935
Koschagyl field	Makat on Guriev-Orsk line	60	8	1935
Kulsary field	Koschagyl field	12	8	.....
Rakuska on Caspian Sea	Dossor on Guriev-Orsk line	35	8	1930
Grozny Area:				
Armavir (on Grozny-Tuapse line)	Gorlovaka (Trudovaya)	305	12	1933
Grozny fields	via Armavir and Maikop fields to Tuapse on Black Sea	385	10	1928
Makhach-Kala on Caspian	Grozny	100	12	1924
Makhach-Kala	Grozny	100	12	1935
Maglobek field	Grozny	55	8	1940
Maikop Area:				
Maikop (Neftegovck)	Krasnovdor	67	8	1940
Sakhalin Area:				
Okha field	Moskalvo	20	10	1942?
Ekhabi field	Okha	12	10	1937
South Georgian Area:				
Mirzaani	Kachreti	25	8	1940
Turkmen Area:				
Krasnovodsk on Caspian Sea	Ashkhabad	300	..	.....
Ural-Volga Area:				
Ishimbaevo fields	Ufa refineries	103	6	1937
Ishimbaevo fields	Ufa refineries	103	6	1939
Tuimaza fields	Ufa refineries	95	12	1940
Yablonova field	Batraki	45	12	1940
Syzran field	Batraki	14	10	1947

Natural Gas Pipe Lines in U.S.S.R.

Origin	Terminus	Length (Miles)	Diameter (Inches)	Year Completed
Elshanka Field	Saratov	17	16-18	1942
Saratov Fields	Moscow	500	.....	1947
Daszawa (former Poland) Field	Kiev, with branch to Vinnitsa	350	.....	1947
Daszawa Field	Lwow	.....	.....	.....
Burguslow Field	Kuibishev	97	10	1943
Palvan-Tash Field	Leninsk	.....	.....	.....
Pravoderezhnoze Field	Grozny	16	.....	1947
Yablonovo	Pokhirstnevo	20	.....	.....

Refineries of U. S. S. R.

LOCATION	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery	Operating Status
European Refineries:				
Baku (5 Refineries)	375,000	50,000	Skim-Crk	Operating
Batumi	2,000	.....	Skim.	Operating
Berdyansk	.....	5,000	Crk.	Operating
Boulova	.....	.....	.....	Unknown
Burguruslan	.....	.....	.....	Operating
Chelyabinsk	.....	.....	.....	Operating
C. Gorodki	28,000	5,000	Skim-Crk.	Unknown?
Drohobycz[1] (4 refineries)	3,000	1,000	Complete	Rebuilding
Gleboka (Sambor)[1]	100	.....	Skim.	Rebuilding
Gorki	.....	10,000	Cracking	Operating
Grozny (3 Refineries)	150,000	50,000	Skim-Crk.	Operating
Gurev	1,000	.....	Skim.	Operating
Ishimbaevo	9,000	.....	Topping	Operating
Iskine	.....	.....	Topping	Unknown
Kazan	.....	.....	.....	Unknown
Kherson	.....	5,000	Cracking	Operating
Krasnodar (Maikop)	25,000	.....	Skimming	Rebuilding
Kuibyshev	.....	.....	.....	Operating
Leningrad	.....	5,000	Cracking	Destroyed
Makhach Kala	2,000	.....	Skimming	Operating
Molotov (Perm) (2 Refineries)	12,000	4,000	Skim-Crk.	Operating
Moscow	.....	12,800	Cracking	Operating
Munracs[2]	420	.....	Skimming	Unknown
Nadworna[1]	200	.....	Skimming	Unknown
Nebit Dag	.....	.....	.....	Building
Nikolaev	.....	.....	.....	Unknown
Novobogatinsk	500	.....	Skim.	Operating
Odessa	.....	5,000	Cracking	Operating
Orsk	28,000	5,000	Skim-Crk.	Operating
Saratov	.....	35,000	Cracking	Operating
Sernovo	.....	.....	.....	Operating
Stalingrad	.....	.....	.....	Rebuilding
Sterlitamak	15,000	.....	Skimming	Operating
Stryj[1]	250	.....	Skimming	Unknown
Syzran	.....	.....	.....	Operating
Tbilisi (Tiflis)	.....	.....	.....	Operating
Tuapse	35,000	10,000	Skim-Crk.	Rebuilding
Tuimaz	.....	.....	.....	Operating
Ufa	28,000	5,000	Skim-Crk.	Operating
Ukhta	.....	.....	Topping	Operating
Ustrzyl i Dolna[1]	1,000	.....	Skimming	Unknown
Yaroslavl	9,000	4,000	Skim-Crk.	Operating
Zniesienie (Lwow)[1]	1,000	.....	Skim-Lube	Unknown
Asiatic Refineries:				
Fergana (4 Refineries)	40,000	10,000	Skim-Crk.	Operating
Irkutsk	.....	.....	.....	Operating
Khabarovsk	4,500	3,500	Skim-Crk.	Operating
Komosomolsk	4,500	3,500	Skim-Crk.	Operating
Krasnovodsk	4,000	3,000	Skim-Crk.	Operating
Krasnoyarsk	.....	.....	.....	Operating
Moskalvo	.....	.....	Topping	Operating
Nikolaevsk	4,500	3,500	Skim-Crk.	Operating
Vladivostok	.....	.....	.....	Operating

[1] Refineries located in former Polish territory.
[2] Refinery located in former Czechoslovakian territory.

CLEVELANDS

on your Pipe-Line Trenching Jobs

REGULARLY DELIVER

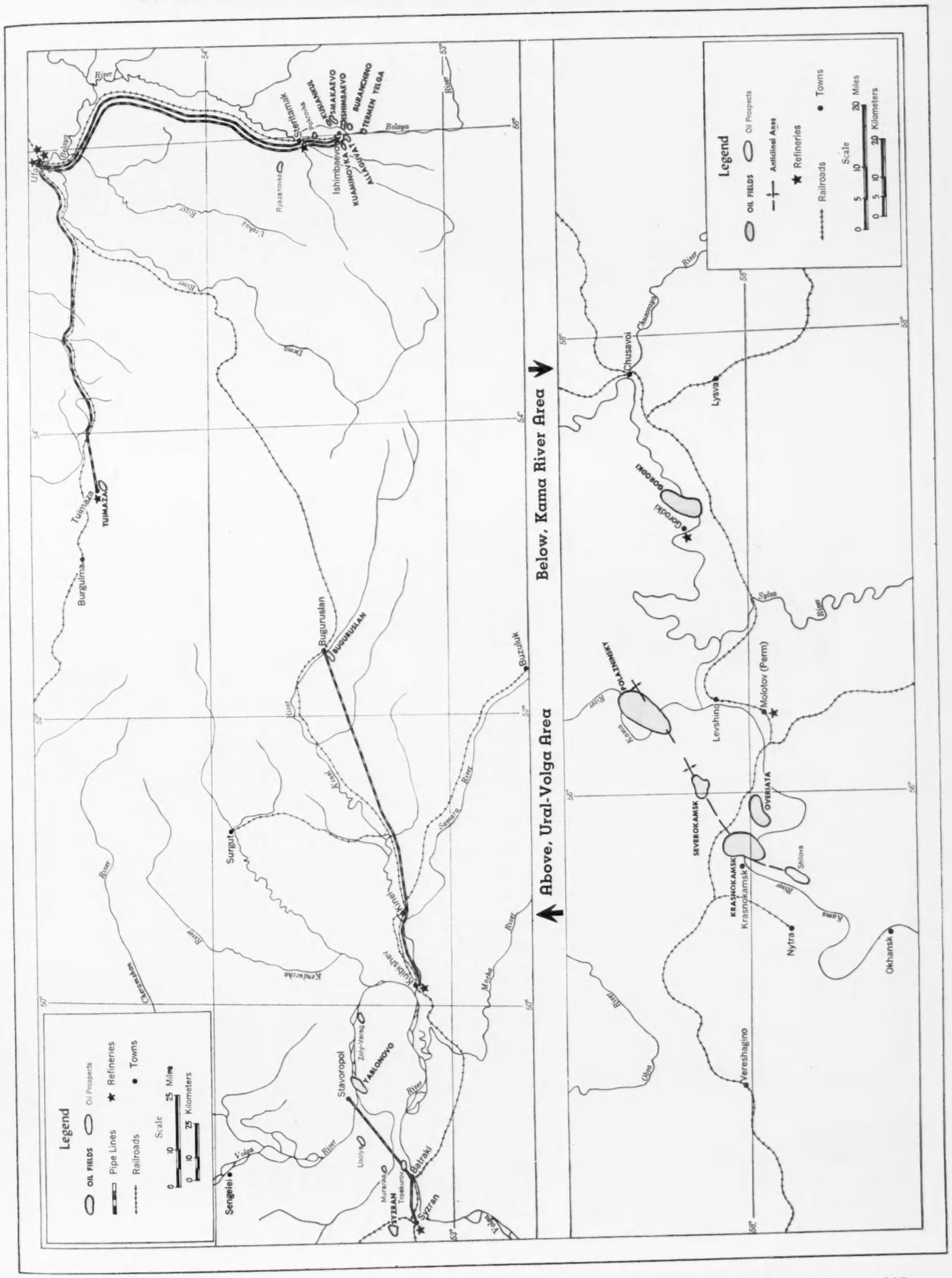
HIGH PERCENT MACHINE TRENCH
HIGH DAILY FOOTAGE
***At* LOW COST**
***With* FEW DOWN TIMES**
***And* FAST MOVES**

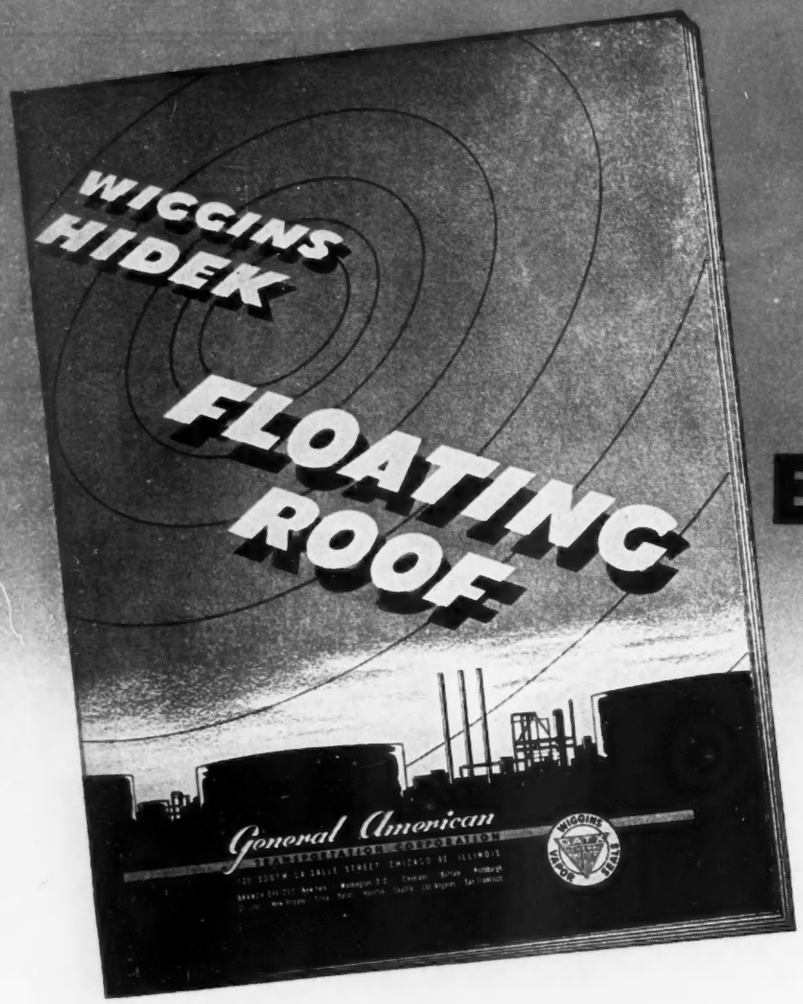
FROM ALL ANGLES CLEVELANDS ARE THE WISE INVESTMENT FOR YOUR PIPE LINE TRENCHING WHETHER IT'S TRANSMISSION..GATHERING..STRIPPING FOR LARGE OR SMALL DIAMETER

TRADE MARK

THE CLEVELAND TRENCHER CO.
20100 ST. CLAIR AVENUE CLEVELAND 17, OHIO

U. S. S. R.—Ural-Volga and Kama River Fields and Prospects





REDUCE EVAPORATION LOSSES

WIGGINS CONSERVATION STRUCTURES

- Hidek Floating Roofs
- Lodek Floating Roofs
- Balloon Roofs
- Breather Roofs
- Dry Seal Lifter Roofs
- Dry Seal Gas Holders

One of the most significant developments in the handling and storing of petroleum products, the Wiggins Hidek Floating Roof, is now presented through the medium of three-dimensional phantom drawings — with full explanatory text.

The bulletin explains fully how breathing and pumping losses are reduced to a minimum and product quality retained by:

Hermetically sealing the liquid surface with triple seal protection.

Permitting the relatively small volume of vapor intentionally trapped beneath the roof to expand without venting.

This bulletin contains information vital to every phase of management, information which the executive concerned with the efficient storage and marketing of petroleum products can use to reduce losses and increase profits.

WIGGINS VAPOR SEALS
GENERAL AMERICAN
TRADE MARK

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 SOUTH LA SALLE STREET, CHICAGO 90, ILLINOIS

BRANCH OFFICES: New York • Washington, D. C. • Cleveland • Buffalo • Pittsburgh • St. Louis
New Orleans • Tulsa • Dallas • Houston • Seattle • Los Angeles • San Francisco

Sub-licensees

WESTERN STATES: Consolidated Steel Corp.—Western Pipe & Steel Co. of California, Los Angeles—San Francisco • CANADA: Toronto Iron Works, Ltd. Toronto
SOUTHERN STATES: Wyatt Metal and Boiler Works, Houston — Dallas, Texas • GREAT BRITAIN: Motherwell Bridge & Engineering Co., Ltd., Scotland
FRANCE: Etablissements Delattre & Frouard reunis, Paris

U. S. S. R.—Continued

between 1833 and 1875 by bailing from hand-dug pits along seepages.

The Grozny area suffered considerable damage through wartime destruction of wells and installations, and along with the Baku fields, is said to have suffered more than a little damage through having been produced at inefficient rates in an effort to meet production quotas during the first and second Five-Year Plans. Currently it is reported that con-

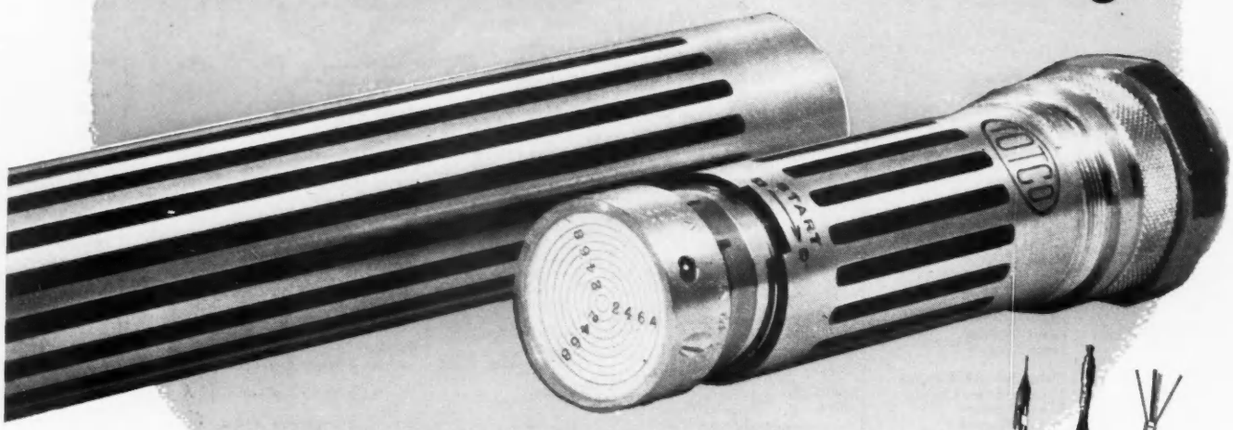
Engineering and Geological Data on U. S. S. R. European Fields

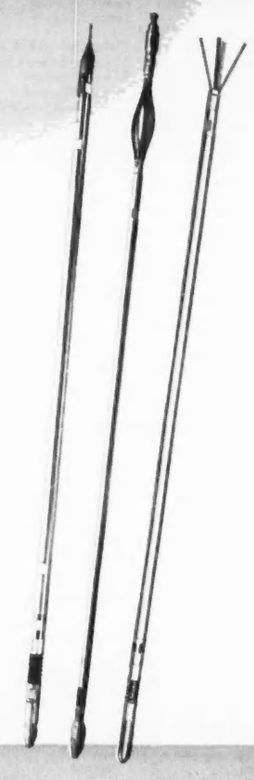
Area and Field	PRODUCING FORMATION		
	Age	Depth (Feet)	Type Structure
Baku (Azerbaijan) Area:			
Artem (Holy Island)	Middle and Lower Pliocene	3500-9000	Anticlinal Fold
Baladzhary	Lower Pliocene	4729	Anticline
Bibi Eibat	Middle Pliocene	3500-5000	Anticline
Binagady	Lower Pliocene	1500-3116	Anticlinal Fold
Duvanny	Pliocene	Shallow	Anticline
Durov Dag	Middle Pliocene	.....	Anticlinal Fold
Duz Dag	Middle Pliocene	.....	Anticlinal Fold
Fatlmay	Upper Pliocene	1788	Anticline
Gamma	Middle Pliocene	.....	Anticlinal Fold
Kala	Upper to Lower Pliocene	2800-4200	Dome on Fold
Kara-Chkhur	Middle to Lower Pliocene	3440-9000	Anticline
Kara Dag	Middle Pliocene	5340	Anticlinal Fold
Kergez-Kyzyl Tepe	Middle Pliocene	.....	Anticline
Lenin (Balakhany, Sabunchy, Ramany)	Upper to Lower Pliocene	3800-5184	Anticline
Lok-Batan (Mikoyan)	Middle Miocene to Upper Pliocene	.....	Anticlinal Fold
Mahomedly	Upper Pliocene	.....	Anticline
Miadjik	Middle Pliocene	Shallow	Anticline
Nephte Chala	Pliocene	.....	Folded Fault
Peschanny	Middle to Lower Pliocene	.....	Anticline
Pirsagat	Middle Pliocene	4120	Anticlinal Fold
Puta (Molotov)	Middle Pliocene	.....	Anticlinal Fold
Saryncha-Guilbakht	Middle Pliocene	.....	Anticlinal Fold
Shongar	Middle Pliocene	.....	Anticlinal Fold
Shuraabad	Oligocene	Shallow	Overthrust Fold
Shubany (Atashka)	Lower Pliocene	.....	Diapir Fold
Sian Shor	Lower Pliocene	5180	Anticlinal Fold
Siazan	Cretaceous and Oligocene	.....	Overthrust Fold
Surakhany	Upper to Lower Pliocene	3800-5200	Anticline
Sulu Tepe	Lower Pliocene	5200	Anticlinal Fold
Touragai	Middle Pliocene	.....	Anticlinal Fold
Zykh (Beriya)	Middle and Lower Pliocene	.....	Anticlinal & Dome
Carpathian Area:			
Bitkow	Oligocene	3610	Anticline
Boryslaw	Oligocene (Eocene, Cretaceous)	4270-5700	Folds
Czarna	Oligocene	1310	Anticlinal Fold
Daszawa	Miocene	2300	Anticline
Kosmacz	Cretaceous	1920	Anticline
Lipic	Oligocene	1310	Anticline
Lodyna	Oligocene	1150-1900	Diapir Fold
Majdan	Eocene	590-1650	Anticline
Nahujowice	Oligocene and Eocene	535- 656	Anticline
Opaka	Eocene	1970	Anticline
Orow	Cretaceous	300-1835	Fold
Perehinsko	Oligocene	2625	Anticline
Polana	Oligocene	325- 685	Anticline
Rajskie	Oligocene	980-1300	Asymmetrical Fold
Rypne	Oligocene	500-3700	Fold
Schodnica-Urycez	Cretaceous	1480	Anticline
Slobada-Rungurska	Cretaceous	400-1000	Anticline
Strzelbice	Cretaceous	660	Anticline
Crimea Area:			
Arma Eli	Middle Miocene	.....	Anticlinal Fold
Chongelek	Middle Miocene	.....	Diapir Fold
Kop Kochegen	.....	.....	Anticline
Kerlent	Middle Miocene	.....	Anticlinal Fold
Maly Babchik	Middle Miocene	.....	Anticlinal Fold
Mayak	Middle Miocene	.....	Anticlinal Fold
Tarkhan	Middle Miocene	.....	Anticlinal Fold
Daghestan Area:			
Achi Su	Middle Miocene	985-2300	Anticlinal Fold
Berekei	Oligocene & Eocene Contact	.....	Domal Uplift
Dag Ogni	Oligocene	60-1000	Domal Fold
Duzlak	.....	.....	Dome
Izber Bash	Middle & Lower Miocene	3025-4685	Domal Anticline
Kaia Kent	Middle Miocene	655-1640	Anticline
Emba Area:			
Alybair-Aral	.....	.....	Salt Dome
Baichunas	Jurassic	.....	Salt Dome
Chernaya-Retchka	Jurassic	Shallow	Salt Dome
Dossor	Jurassic	246- 690	Faulted Dome
Dshaksymat	.....	.....	Faulted Dome
Iskine	Jurassic-Salt Core Contact	2195	Salt Dome
Karagal	.....	.....	Salt Dome
Kashkary	Jurassic	.....	Salt Dome
Koschaghyl	Jurassic	350-1200	Salt Dome
Kulsary	Jurassic	.....	Salt Dome
Kurgus	Jurassic	.....	Salt Dome
Makat	Jurassic	.....	Salt Dome
Novobogatinsk	Jurassic	.....	Salt Dome

Area and Field	PRODUCING FORMATION		
	Age	Depth (Feet)	Type Structure
Sagis	Lower Cretaceous & Middle Jurassic	328-2132	Faulted Dome
Shobarkuduk	.....	.....	Salt Dome
Georgian Area:			
Little Shiraki	Lower Pliocene & Upper Miocene	980-7850	Anticlinal Fold
Mirzaani	Lower Pliocene & Upper Miocene	980-7850	Anticlinal Fold
Norio	Cretaceous or Tertiary	.....	Anticlinal Trend
Sabsa Ompareti	Tertiary	.....	Anticline
Grozny Area:			
Adu-Yurt	Upper Miocene	3650	Overthrust Fold
Akhazovski	Middle Miocene	.....	Folded Overthrust
Ali Yurt	Middle Miocene	9185	Overthrust Fold
Bakowici	Middle Miocene	.....	Anticline
Benoi	Oligocene	3600	Anticlinal Fold
Gorskaya Mountain	Middle Miocene	3530	Fold Anticline
Grozny, New (October)	Middle Miocene	7220-10200	Anticline
Grozny, Old	Middle Miocene	7220-10200	Folded Anticline
Gudermes	Middle Miocene	3840-4595	Anticline
Gunushki	Middle Miocene	4315	Anticline
Makhkety	Middle Miocene	3280-3940	Anticline
Malgobek	Middle Miocene	990-2300	Anticlinal Fold
Oisunger	.....	.....	Anticline
Sterch-Kert-Tycha	.....	3300	Anticline
Voznessenka	Middle Miocene	990-2300	Anticlinal Fold
Kama River Area:			
Gorodki	Permian	3200	Buried Reef
Krasnokamsk	Permian & Upper Carboniferous	2950-3100	Anticline
Overiata	Permian & Upper Carboniferous	.....	Anticline
Polazna	Permian & Upper Carboniferous	3400	Anticline
Severokamsk	Permian, Upper Carboniferous & Devonian	3200-5840	Anticline
Shilovo	Permian	3152	Anticline
Kuban-Maikop Area:			
Abuzy	Oligocene	2500-4920	Monocline
Adaghum	Upper Miocene	985	Diapir Fold
Asphalt Mountain	Lower Miocene & Oligocene	2240-2950	Monocline
Ilsk	Oligocene	.....	Monocline
Kalujsky	Middle Miocene	.....	Monocline
Kerlanty	.....	5050	Monocline
Keslerovo-Varenikovo	Upper Miocene & Oligocene	1148-1640 2625-3280	Diapir Fold
Khadyzhensky	Oligocene	2240-3480	Monocline
Krymsky-Kudako	Middle Miocene	650-1640	Anticline
Kura Tsitse	Lower Miocene & Oligocene	2250-2950	Monocline
Kutaiss	Lower Miocene & Oligocene	2240-2950	Monocline
Maikop (Apsheron)	Lower Oligocene	1640-3480	Monocline
Sepsil	Oligocene	.....	.....
Shirokaya Balka	Lower Miocene & Oligocene	2240-2950	Monocline
Suvorov-Cherkess	Pliocene & Miocene	330-1475	Domal Uplift
Pechora Area:			
Ukhta (Chibien, Ust Kulm, Yareg)	Devonian	.....	Anticline
Saratov Area:			
Dergachi	Upper Pliocene	383-3300	.....
Kurdium	Upper Pliocene	1716	.....
Teplovka	Upper Pliocene	1320	.....
Yelshanka	.....	.....	.....
Ukraine Area:			
Melitopol	Mesozoic	.....	Salt Dome
Poltava	.....	.....	Salt Dome
Romny	Mesozoic	.....	Salt Dome
Ural-Volga Area:			
Allaguvatovo	Lower Permian	1650-2085	Buried Reef
Buguruslan	Permian	985	Anticlinal
Buranchino	Lower Permian	1640-2085	Buried Reef
Ishimbaevo	Lower Permian	1640-2085	Buried Reef
Kinzibulatov	Permian	.....	Reef
Kusiankul	Lower Permian	1380-2490	Buried Reef
Kuzminowka	Lower Permian	.....	Buried Reef
Shugarov	.....	.....	.....
Smakaevo	Lower Permian	.....	Diapir Fold
Syzran	Upper & Lower Carboniferous	2130-3280	Domal Uplift
Termen-Yelga	Lower Permian & Devonian	2750	Reef
Tuimaza	Carboniferous	3440-3775	Buried Reef
Yablonovo (Stavropol)	Upper & Lower Carboniferous	2130-3280	Domal Uplift

Drill *Faster, Cheaper, More Efficiently*

...with the Dependable TOTCO RECORDER *and* Controlled Vertical Drilling





Controlled Vertical Drilling with the TOTCO Recorder pays off in a number of ways. First, because you can bottom a straight hole in less time than a crooked hole. Takes less power, too. There's less wear on drill pipe, no worry about stuck casing. To top it off, a straight hole is a trouble-free producer.

And there's nothing mysterious or difficult about the technique of drilling vertical holes. It's actually easier than drilling crooked ones. Just take frequent readings with a TOTCO Recorder—the most accurate instrument of its kind ever offered.

TOTCO readings can be taken at any time—by any member of the drilling crew. They will tell you – within one-eighth of a degree—exactly where your hole is going.

TOTCO furnishes equipment for running the TOTCO Recorder in any one of 5 convenient ways—no need to make a special run. It can be done any time in a matter of minutes.

Write for full information.

Totco Equipment is leased or rented in the U.S.A.; sold for export only.

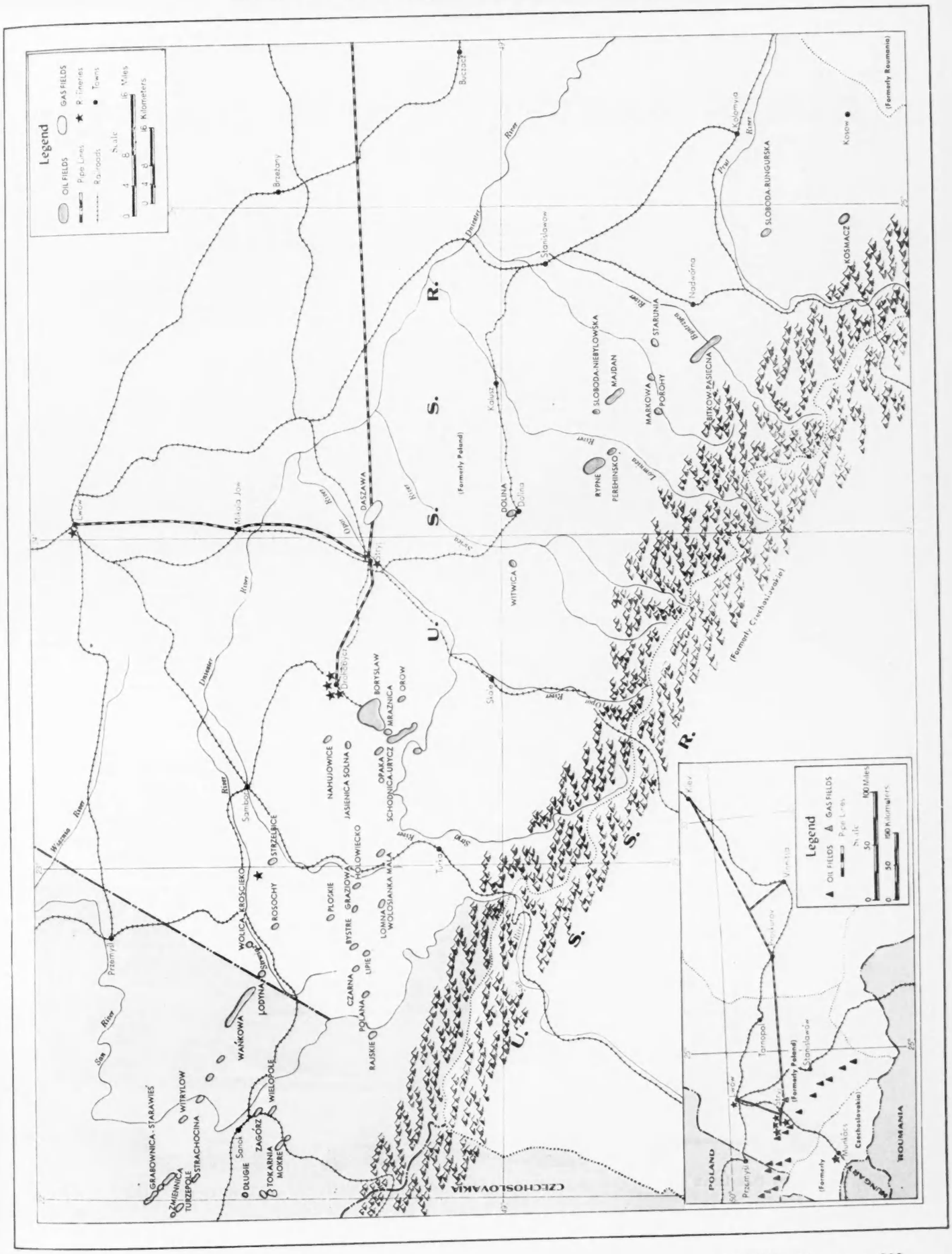
TOTCO

TECHNICAL OIL TOOL CORP., Ltd.

1057 N. LA BREA AVENUE • LOS ANGELES 38, CALIFORNIA

Exclusive Distributors: California — REPUBLIC SUPPLY COMPANY OF CALIFORNIA • Domestic (outside California) — CONTINENTAL SUPPLY COMPANY • Canada—OIL WELL SUPPLY COMPANY • Export (except Canada) —LUCEY EXPORT CORP., New York

U. S. S. R.—Carpathian (Former Polish) Fields


Legend
OIL FIELDS
GAS FIELDS
Pipe Lines
R. Theries
Railroads
Towns
Scale
16 Miles
16 Kilometers
U. S. S. R.
(Formerly Poland)
(Formerly Czechoslovakia)
(Formerly Roumania)
CZECHOSLOVAKIA
POLAND
ROUMANIA
BORYSLAW
MRAZNICA
OROW
DASZAWA
DOLINA
WITWICA
STARUNIA
KOSMACZ
SLOBODA RUNGURSKA
SLOBODA-NIEBYLOWSKA
KAJDAN
MARKOWA
POROHY
RYPNE
PEREHINSKO
BUTKOW PASIECNA
NAHUJOWICE
JASIENICA SOLNA
OPAKA
SCHODNICA-URYCZ
STRZELECKE
BOSOCHY
PLOSKIE
GRAZIOWA
HOLOWIECKO
BYSTRE
LOMNA
WOLOSIANKA MALA
LUPIE
CZARNA
POLANA
RAJSKIE
WOLICA KROSCIENKO
WANKOWA
LODYNA
GRABOWNICA-STARAWIES
ZMIENNICA
TURZEPOLE
STRACHOCINA
WITRYLOW
DLUGIE
ZAGORZ
TOKARNIA
MOKRE
WIELOPOLE
Przemysl
Sambor
Stanislawow
Tarnopol
Lwow
Kolomyya
Kosow
Munkacs
Buczacz
Brzezany
Mikolajow
Drohobycz
Turka
Sambor
Sanok
Przemysl
Lwow
Tarnopol
Stanislawow
Munkacs
Kolomyya
Kosow

BUILT IN TEXAS HOBBS **USED EVERYWHERE**

HOBBS MANUFACTURING COMPANY

FORT WORTH, TEXAS
609 North Main St.

HOUSTON, TEXAS
4510 Navigation Blvd.

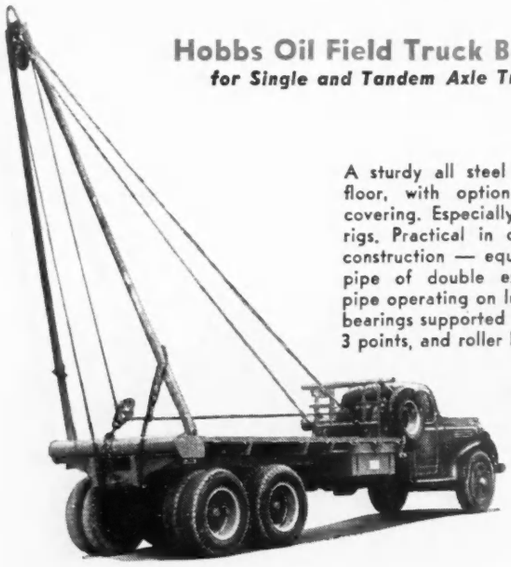
SAN ANTONIO, TEXAS
823 Roosevelt Ave.

DALLAS, TEXAS
1852 Plantation

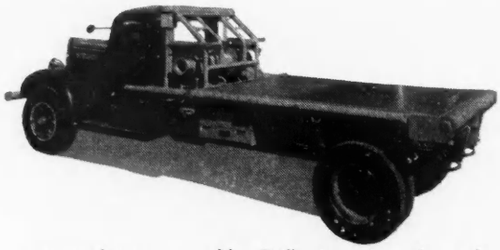
LUBBOCK, TEXAS
2809 Avenue H

Hobbs Oil Field Truck Bodies

for Single and Tandem Axle Trucks



A sturdy all steel body with solid oak floor, with optional steel deck plate covering. Especially valuable for moving rigs. Practical in design — durable in construction — equipped with roller tail pipe of double extra heavy hydraulic pipe operating on lubricated anti-friction bearings supported by overload rollers at 3 points, and roller line guides to prevent wear and tear on cable. Drill pipe gin poles, telescoped in 2 lengths. All steel headache post made of pipe and easily removed for winch repairs and service. Sizes for 1½-ton to 12-ton trucks. Tailormade to fit trucks.

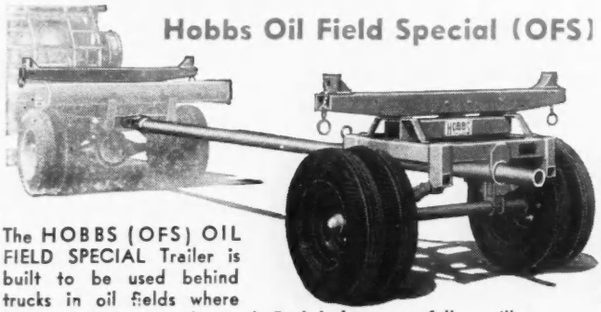


Write, Wire, or Cable for Specifications and Quotations

Hobbs WT4 Tandem Pole Trailer

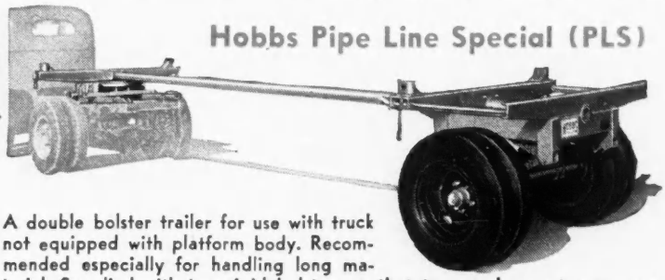
Capacity 60,000 lbs. Truck and Trailer; 30,000 lbs. Trailer alone. No load on pole. Because of separately mounted axles and adjustable ball type tongue, WT4 is used as conventional pole trailer, 4-wheel trailer, or wagon behind truck or tractor.

Hobbs Oil Field Special (OFS)



The HOBBS (OFS) OIL FIELD SPECIAL Trailer is built to be used behind trucks in oil fields where Oil Field Body is on the truck. Both bolsters are fully oscillating to facilitate loading and to permit sharp turns with minimum amount of bending. Pressed steel channel, electrically welded frame assures longer service and fewer repairs. Frame is flexible to eliminate cracking under hard usage.

Hobbs Pipe Line Special (PLS)



A double bolster trailer for use with truck not equipped with platform body. Recommended especially for handling long material. Supplied with two rigid bolsters so that tongue does not carry any load. The pipe itself acts as the tongue or pulling medium. The telescoping tongue is designed to haul pipe 10 to 40 feet long. The sliding lugs are adjustable to any load. Fully oscillating truck bolster facilitates loading and enables making sharp turns without binding or spilling. Sizes for 2 and 3 ton trucks.

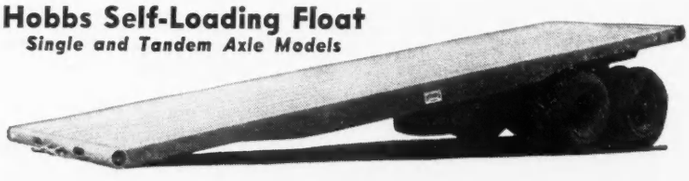
Hobbs Self-Loading Float

Originated by Hobbs as solution to one of the biggest problems of the oil field operator and the road contractor — that of loading and unloading heavy, concentrated loads. ELIMINATES need of additional trucks equipped with winches and gin poles for placing load on trailer. Makes use of power winch on truck as means of lowering float to ramp position. Then truck is backed up to rear of trailer and winch pulls load on. When load is in place truck is again moved to front and winch lifts trailer back up into traveling position. One man easily can handle the entire operation.

(Loading Method Illustrated by Silhouettes)

Hobbs Self-Loading Float

Single and Tandem Axle Models



GOING FOR LOAD

LOADING BY MEANS OF TRUCK WINCH

LOADED AND READY TO GO

siderable emphasis is being placed on the possibilities of applying secondary recovery methods to these and others of the older areas. Due to the thickness of producing section and the many sands from which production is obtained, it is thought that much oil can be recovered through application of the proper recovery methods. Some of the wells in the eastern part of the Old Grozny field have produced as much as 10,000,000 barrels each during their lives. The New Grozny field, about 3½ miles south of Old Grozny, recorded 22 producing zones, but although the field has produced a cumulative total of 363½ million barrels, about 85 percent of the total was produced from three principal producing horizons, all of which lie in the middle part of the Miocene.

Considerable promise had been held for the Crimea region, but very little accurate information has been available on recent developments. The area had just entered the early stages of development at the bginning of the war.

Aside from the development in the Turkmen fields, on the eastern shore of the Caspian Sea, and the Uzbek-Tadzhik-Kirghz areas farther inland, the only other producing regions of Asiatic Russia are in the extreme east where Sakhalin Island fields are said to have increased in importance rapidly since the war. 1947 production is estimated to be 18,630 barrels a day, most of which is processed in the refinery at Khabarovsk on the Amur River, being transported to the refinery through a submarine line reported to have been constructed across the Strait between Moskalvo on Sakhalin and Nikolaevsk on the mainland. Unconfirmed reports say that the Khavarovsk plant has been expanded greatly from its original capacity of some 4000 barrels a day, and other refineries have been constructed on the Amur.

Engineering and Geological Data on U. S. S. R. Asiatic Fields

Area and Field	PRODUCING FORMATION		
	Age	Depth (Feet)	Type Structure
Eastern Siberia Region:			
Ust Maya	.....	.....	.....
Sakhalin Island:			
Ekhabi	Upper Pliocene	310- 630	Anticline
Katangli	Upper Pliocene	2460	Anticline
Nutovo	Upper Pliocene	260-2885	Anticline
Okha	Upper Pliocene	300- 775	Anticline
Polomai	Middle & Lower Pliocene	8858	Anticline
Vigrek	Upper Pliocene	120- 220	Anticline
Turkmen Area:			
Cheklishlyar	Middle Pliocene	.....	.....
Cheleken	Pliocene	820	Faulted Dome
Nebit-Dag	Middle Pliocene	.....	Anticline
Neftedag	Upper & Middle Pliocene	.....	Anticline
Uzbek-Kazakh-Tadzik (Fergana) Area:			
Ak-Mecket	Eocene	.....	Anticline
Adnizhan	.....	.....	Anticline
Barrik	.....	.....	Anticline
Changirtash	.....	.....	Anticline
Chimmon	Eocene	1000	Anticline
Chu	.....	.....	Anticline
Dzhur-Kurgan	.....	.....	Anticline
Encunimsai	.....	.....	Anticline
Eno-Sing	.....	.....	Anticline
Kamishbeshi	.....	.....	Anticline
Kanabad-Sai	.....	.....	Anticline
Kaudag	Oligocene	528	Anticline
Kim (Sel Rokho)	Eocene	.....	Anticline
Komosol	.....	.....	Anticline
Kulmen	.....	.....	Anticline
Mailisai	.....	.....	Anticline
Melnikovo	.....	.....	Anticline
Mamangan	.....	.....	Anticline
Nefteabad	.....	.....	Anticline
Pavlan Tash	.....	.....	Anticline
Pitaussi	.....	.....	Anticline
Ristansanto	.....	.....	Anticline
Shor-Su (Kagnovich)	Eocene	650	Anticline
Tekebel	.....	.....	Anticline
Uch Kyzyl (Termez)	.....	.....	.....

U.S.S.R. European Field Latest Development Data

BAKU AREA

Artem Field had 396 producing wells at the end of 1939. Cumulative production to end of 1939 was 52,400,000 barrels.

Bibi Eibat Field had 1539 producing wells at the end of 1939. Cumulative production to end of 1939 was 639,497,000 barrels. Field covered area of 7000 acres in 1940 and had 18 producing zones. Newer part of field lies in shallow waters of Ilyich Bay. Field has gasoline recovery plant and stabilization plant.

Binigady Field had 346 producing wells at the end of 1939. Cumulative production to the end of 1939 was 63,553,000 barrels.

Fatmay Field had just found production in 1939 in sixth well drilled.

Kala Field is one of important producing areas, had 944 producing wells at beginning of 1940. Producing area was 3000 acres in 1938. Cumulative production to beginning of 1940 was 165,998,000 barrels. Considerable gas produced from upper and middle portions of productive formations.

Kara Chkhur Field and Zykh Field together had 685 wells at beginning of 1940. Cumulative production to end of 1939 was 110,257,000 barrels. The two fields are closely related and figures carried together. First really important production in Zykh area in 1934.

Kara Dag Field completed first commercial producer in 1939 making 2800 barrels a day from 5300 feet. Drilled 4 additional wells to end of 1939. Estimated annual production since that time about 3,500,000 barrels.

Kergez Kyzyl-Tepe Field had 165 producing wells at end of 1939. Cumulative production to end of 1939 was 7,292,000 barrels.

Lenin Field (Including Balakhany, Sabunchy and Ramany areas) had producing area of 4000 acres at end of 1939. Production in about 15 main zones from a total of 2848 wells at end of 1939. Cumulative production to the end of 1939 was 1,732,395,000 barrels.

Lok-Batan Field had 25 flowing wells at beginning of 1938, producing 1500 to 2000 barrels daily per well. Cumulative production to end of 1939 was 21,000,000 barrels.

Nephte Chala Field produced a total of 2,381,000 barrels of oil to the end of 1939. The field had been producing since 1921, but first important production was in 1936.

Pirsagat Field had produced a total of 1,974,000 barrels to end of 1939. Field is on the shore of the Caspian Sea and in 1940 had been electrified, using electricity for drilling power as well as pumping.

Puta (Molotov) Field has 9 producing zones. It had 872 producing wells at the end of 1939. Cumulative production to the end of 1939 was 90,600,000 barrels.

Shongar Field had not produced commercially up to 1936 when the discovery well reported flowed 14,000 barrels daily. Six wells were drilling at time of latest report in 1938, but no production figures are available.

Shuraabad Field had produced some light oil from Oligocene prior to 1939, but at the beginning of 1940 it was still in initial stages of development and little oil was produced.

Shubany Field had a cumulative total production of 4,500,000 barrels to the end of 1936. Production during 1937 was down to 180,000 barrels of oil for the year, and fluid was about 90 to 95 percent salt water.

Sion Shor Field had first commercial production in 1939 with small well. Proved area at end of 1939 was 40 acres. Four producing zones found.

Siazan Field started producing commercially in 1939, and was producing about 700 barrels daily early in 1940. Had 5 producing wells at end of 1939.

Surakhany Field had 1257 producing wells at the end of 1939. Proved area 1500 acres. Oil saturation high in 10 producing zones. Cumulative production to the end of 1939 was 402,500,000 barrels.

Sulu Tepe Field had 80 wells at end of 1938. Seven producing zones. Cumulative production to end of 1937 was 1,190,000 barrels.

DAGHESTAN AREA

Achi Su Field had 40 producing wells at the beginning of 1938. Proved area was 2000 acres. Main producing zone had a thickness of 700-800 feet and although wells go on pump early, ultimate recovery will likely be great.

Berekei Field first recovered oil from hand-dug pits, and some oil has been recovered from a number of shallow wells. Cumulative Production slightly more than 500,000 barrels. Geology of producing formations quite complicated.

Dag Ongi Field is a gas field with 12 wells having produced 5½ billion cubic feet of gas to the end of 1937. Gas is dry and possibilities of oil in the area considered negligible.

Izber Bash Field is located partly on shore and partly into the Caspian Sea. First pipe line outlet provided in 1940. Production for 1939 was 1,203,000 barrels. Area under water was being exploited in 1940 by directional drilling from derricks on shore. Field has 13 productive sands.

Kara Kent Field has two producing zones. Had 50 wells at the end of 1937. Average depth of wells about 1500 feet, and development should have been rapid.

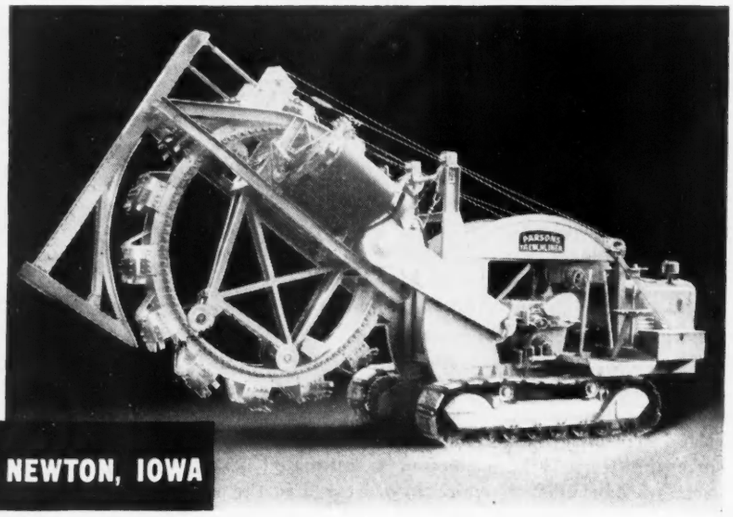
EMBA AREA

The Emba Basin had 10 producing fields in 1939. Most producing structures are salt domes producing from Permian, Middle Jurassic or Lower Cretaceous. No large-scale production from any of the fields, but recoveries average around 25,000 barrels per acre

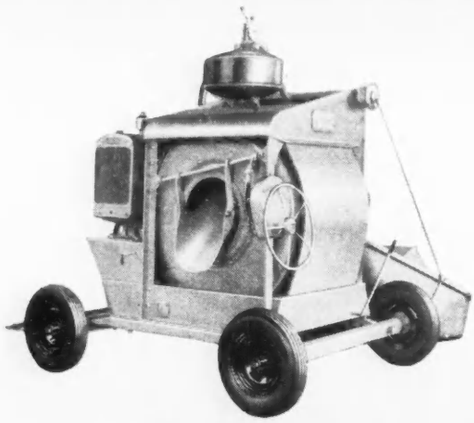
MODERN HEAVY DUTY OIL FIELD CONSTRUCTION EQUIPMENT

KOEHRING PRODUCT

Built for fast mile-a-day pipeline trenching, the Parsons 200 Wheel Trenchliner digs up to 5'6" deep, from 15" to 26" wide. Simple, direct power flow delivers extra power to the wheel. Gears require lubrication only once a season, because they're completely enclosed in oil-tight cases. New pivotal wheel mounting eliminates dirt catching slide tracks, simplifies grading. Shovel type or tractor type crawlers.



PARSONS PARSONS COMPANY, NEWTON, IOWA



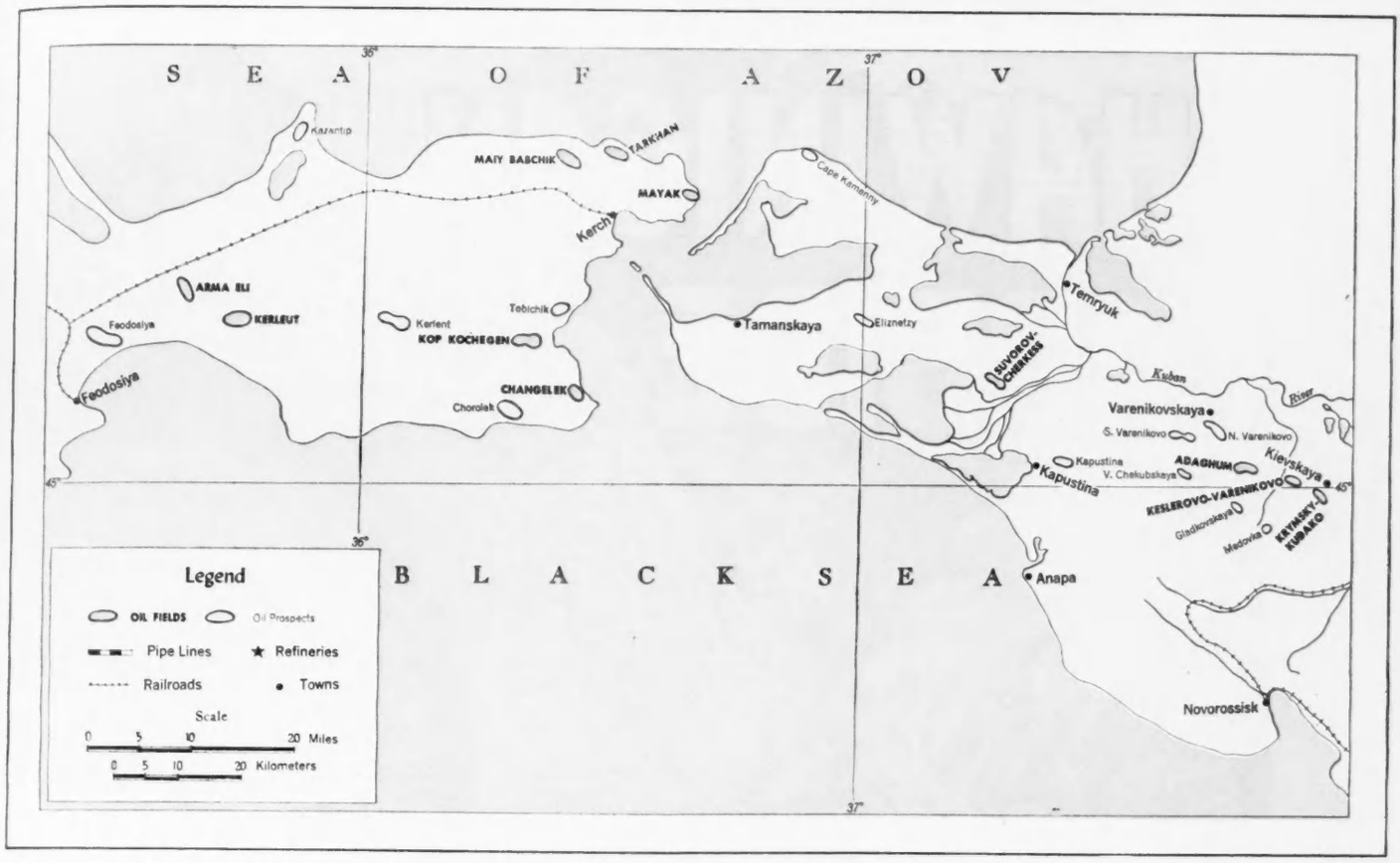
Kwik-Mix Concrete Mixers range in size from 3½-S to 16-S. High output and heavy duty construction make them ideally suitable for oil field and pipeline construction work. Carefully balanced on pneumatic tired wheels, they are easily moved from one pouring location to the next. High strength steel at all strain points supplies extra wear resistance where it's needed. Kwik-Mix re-mixing action produces thoroughly mixed concrete every batch. On the 6-S to 16-S sizes, the famous Kwik-Mix Dandie line, new Selective Skip Shaker speeds up drum charging, tilted Flow-Line Discharge Chute cuts discharge time.

KWIK-MIX KWIK-MIX CO., PORT WASHINGTON, WIS.

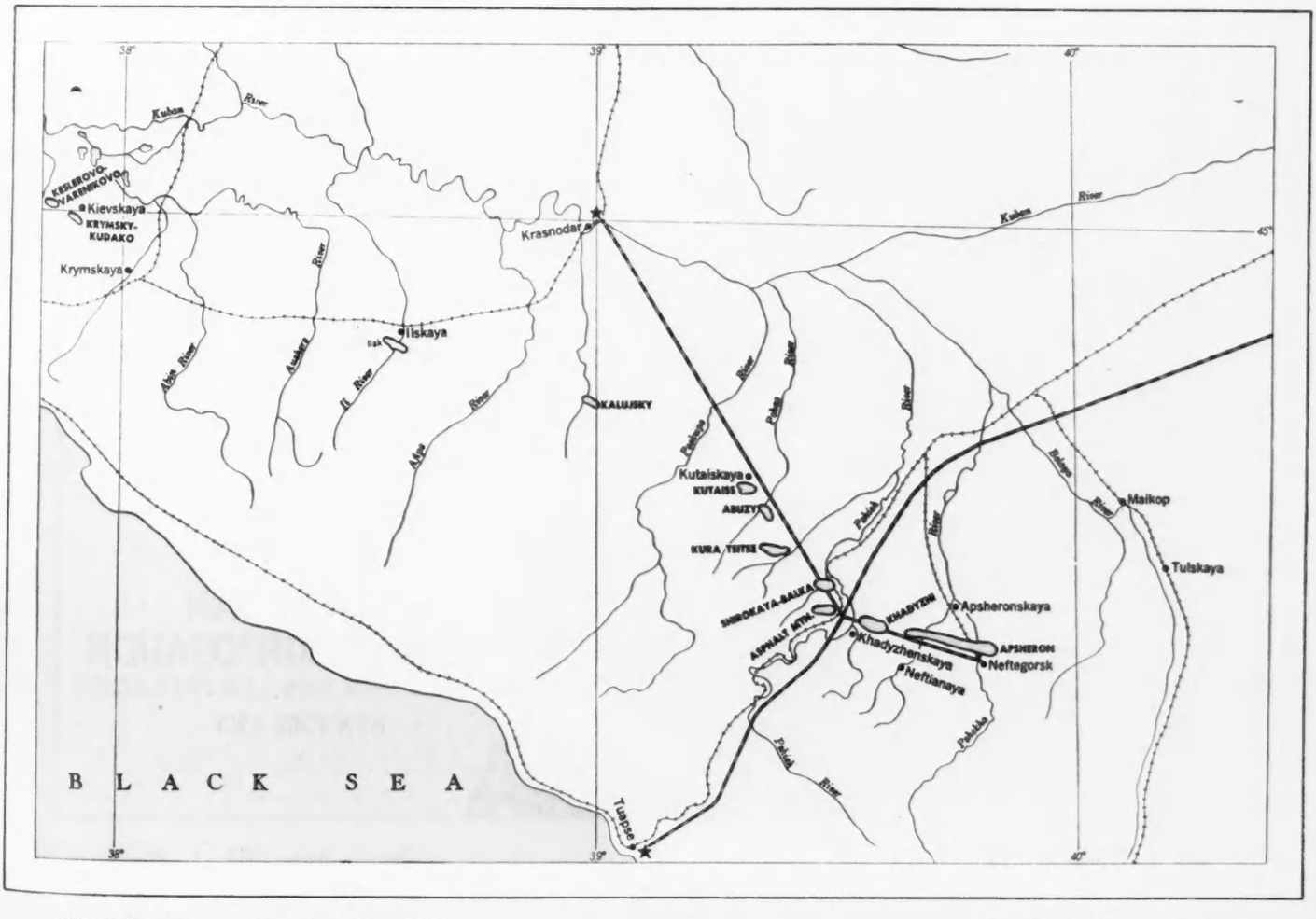
Because they're built for the toughest going, Koehring excavators stand up well under the beating of oil field service. Easily and quickly convertible to shovel, dragline, crane or pull shovel, they are ready, on short notice, for any oil field construction job. Koehring steering and brake arrangement increases mobility and operating safety. Crawlers are self-cleaning even on soft footings. Sizes range from ½ to 1½ yards, as a shovel.

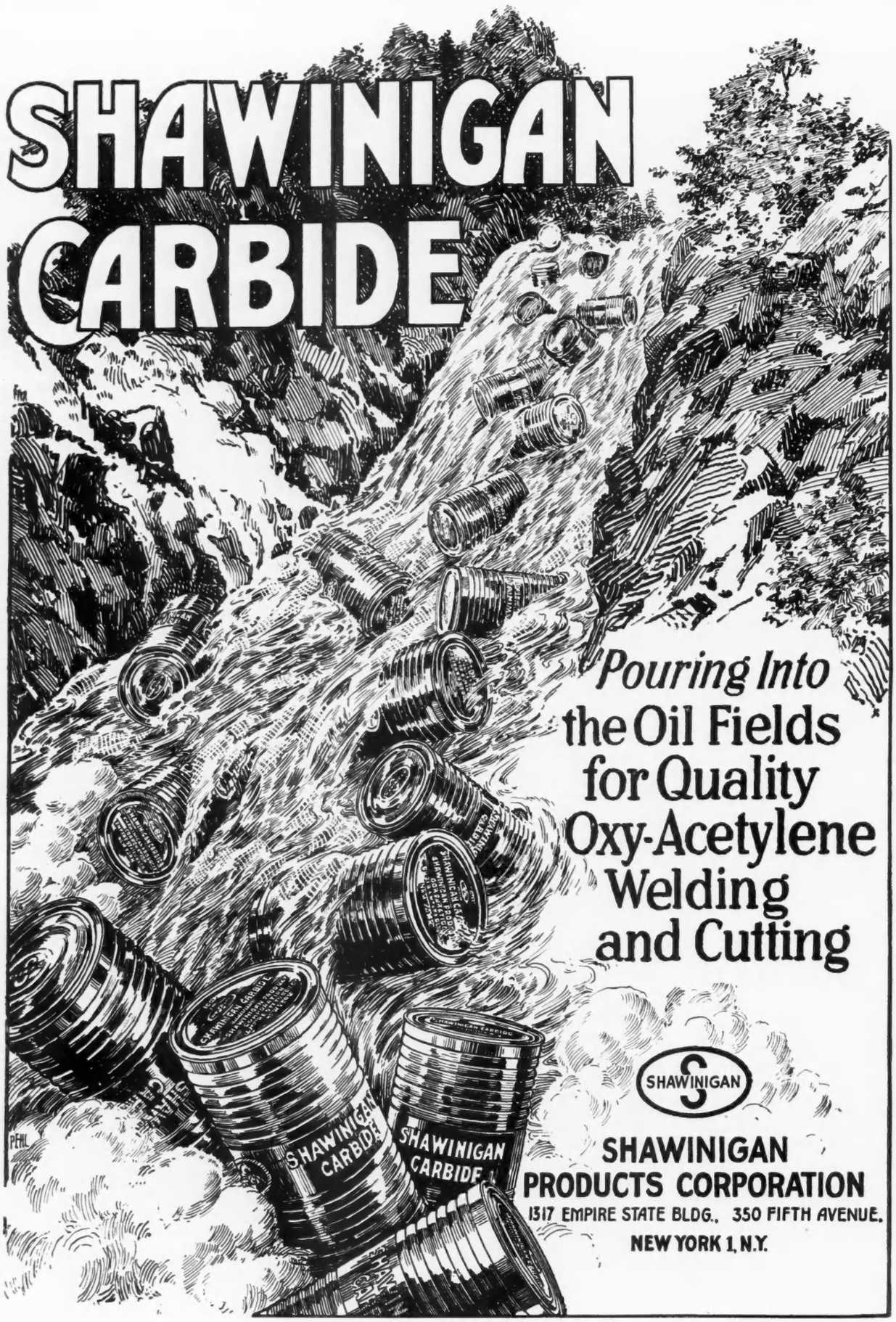
KOEHRING KOEHRING CO., MILWAUKEE, WIS.

U. S. S. R.—Crimea and Kuban-Maikop Fields and Prospects



Southeastern Continuation of Above Map, Same Scale




SHAWINIGAN
CARBIDE
Pouring Into
the Oil Fields
for Quality
Oxy-Acetylene
Welding
and Cutting
SHAWINIGAN
SHAWINIGAN
PRODUCTS CORPORATION
1317 EMPIRE STATE BLDG., 350 FIFTH AVENUE.
NEW YORK 1, N.Y.
SHAWINIGAN CARBIDE
SHAWINIGAN CARBIDE

and run as high as 70,000 barrels. Production in 1939 was 5,118,000 barrels from 533 wells. Cumulative production from the basin was 48,000,000 barrels to the end of 1939.

Koschaghyl Field had 94 producing wells at the end of 1939. Structure is typical salt dome with thick sand section in Jurassic having three principal producing zones. Produced 1,815,000 barrels in 1939.

Sagis Field is a large faulted dome only partially developed in 1939, but was reported in 1944 as best producer in Emba Basin.

GEORGIAN AREA

Little Shiraki Field had 11 producing wells at the beginning of 1938. Proved producing area was 500 acres. Oil produced from 9 sands in Tertiary.

Mirzaani Field had 30 producing wells at the beginning of 1938. Proved producing area was 1800 acres. Performance of early information indicated wells would be long-lived from sands in Lower Pliocene and Upper Miocene with thickness of 200 feet and more.

GROZNY AREA

Grozny Region comprising a number of fields and prospects lying west of the Caspian Sea and north of the Caucasus Mountains. The region had 1234 producing wells at the end of 1939. Cumulative production to end of 1939 was 628,523,000 barrels.

Gorskaya Mountain Field had 78 producing wells at the end of 1939. Cumulative production to the end of 1939 was 5,272,000 barrels, of which 4,830,000 barrels was produced in 1938 and 1939.

Grozny (New) Field had 22 producing zones in 1940. The field had 691 producing wells at the end of 1939, of which 452 were actually working. Cumulative production to the end of 1939 was 363,560,000 barrels. One sand, Zone 16 had produced a total of 161,000,000 barrels to the end of 1939.

Grozny (Old) Field had 473 producing wells at end of 1939. Total area 8,000 acres. The field has 18 producing zones with combined thickness reported to be 1500 feet. It has been producing since 1893 and is believed to be nearing exhaustion.

Makhkety Field had only drilled two producing wells by the end of 1939, but was scheduled for deeper and more intensive drilling later. No record of production.

Malgobek-Voznessenka Field was actually different fields on either end of an anticlinical fold, now connected. The field had 459 producing wells at end of 1939. Cumulative production to end of 1939 was 40,030,000 barrels. New extensions on the south flank in the east end of the area had been reported in 1939.

Alkhazovski Prospect has been reported through the Moscow press as having established production in 1944 through drilling of 14 wells. It was expected to be in regular production during 1945.

Oisunger Prospect has been reported as having completed a well in November, 1939 making 2000 barrels daily. Reports said it was being connected to a pipe line trunk system for production of light oil.

KAMA RIVER AREA

Verkhne-Chusovskiye-Gorodki Field has production from spotty limestone. Cumulative production to end of 1939 was 459,000 barrels (exclusive of 1937 and 1938).

Kraskokamsk Field had seven producing sands in 1940. Producing area was 1200 acres at the end of 1939. It had 8 producing wells in 1937, and is reported to have completed 15 producers during 1939.

Polazhinsky Field (Polazna) Found oil in 1938, recovering about 2000 barrels from the discovery well. Drilling has been active since, but no production data available.

Severokamsk Prospect reported commercial oil in 1938 in two wells which were shut in while development continued in the form of shallow wells for defining the structure in greater detail.

Shilovo Prospect has produced as much as 90 barrels of oil a day from one well drilled to 3100 feet, but subsequent wells have not produced.

KUBAN-MAIKOP AREA

Kuban-Maikop Region which includes Maikop, Krymskaya and Taman areas had 598 producing wells at the end of 1939. Cumulative production to the end of 1939 was 92,138,000 barrels. The fields were occupied by the Germans during parts of 1942 and 1943, but very little production reported because of Russian action. Fields were since rehabilitated. A new area, Shirokaya Balka, had been brought in in 1938 which boosted 1939 production sharply.

Asphalt Mountain Field had productive area of 1500 acres in 1938. It has three deep producing zones and some wells have initial production of 2000 barrels daily.

SARATOV AREA

Teplovka Field had not developed oil production, but had commercial gas in 1939. One well produced gas at the rate of 7,000,000 cubic feet a day in 1944.

UKRAINE AREA

Ukraine Area was not considered particularly promising prior to World War II. A number of structures were prospected, but with the exception of the Romny salt dome only small showings were found. Sedimentary section fairly thin with basement at shallow depths. On the Romny dome several producing wells had been completed to the end of 1939, but production was slight.

URAL-VOLGA AREA

Buguruslan Field had a few wells in 1939 producing 30 to 70 barrels each from depths less than 1000 feet. Production included with other areas and could not be separated.

Ishimbaevo Field had proved area of 1500 acres in 1938. The field had a total of 311 producing wells at the end of 1939, and cumulative production was 37,391,000 barrels. The field produces from limestone formations and wells are usually acidized for production.

Kuzminowka Field was only discovered in 1939 and started producing commercially in 1940.

Smakaevo Field had 5 producing wells at the end of 1939. Cumulative production figures included with those of Ishimbaevo Field.

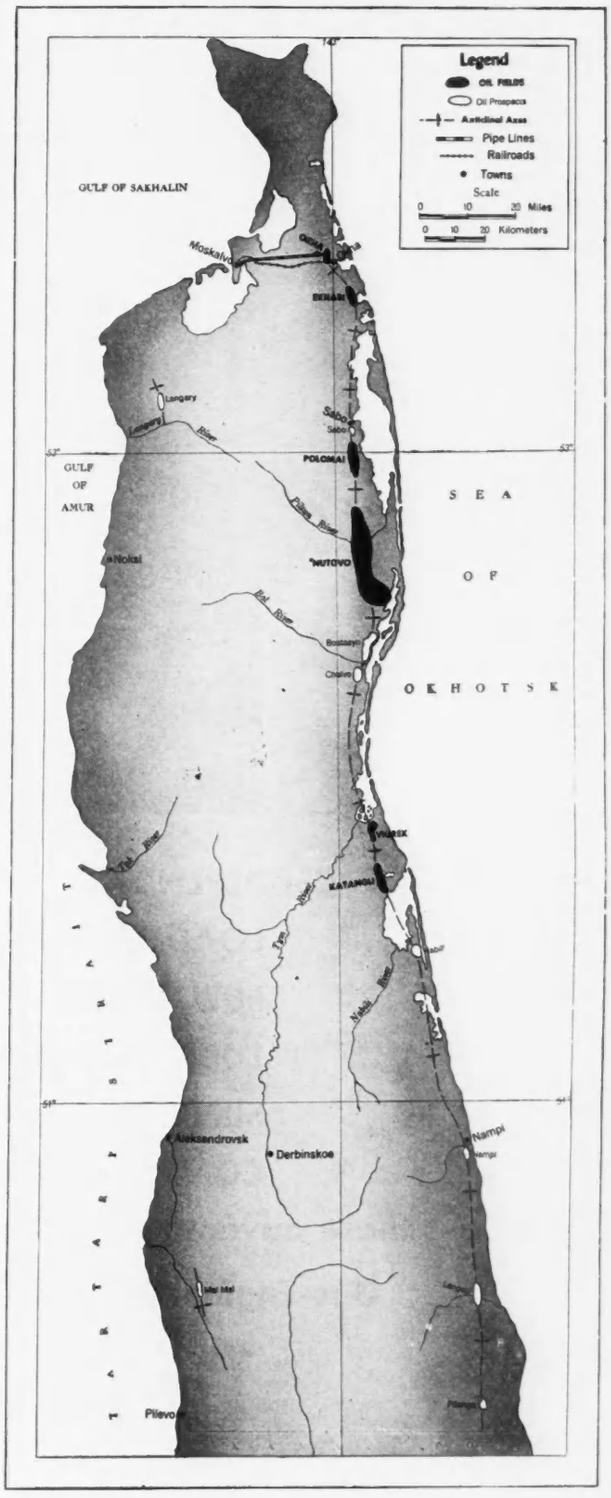
Syzran Field had 2500 acres proved productive in 1938. In 1937 there were six completed wells and five drilling. Some wells drilled to 4200 feet reported initial production as high as 350 barrels daily.

Termen Yelga Field came into production in August, 1939, with completion of a well flowing more than 1000 barrels daily.

Tuimaza Field had 10 producing wells in 1940. Average production 35 to 40 barrels daily per well. Producing zone 30-35 feet thick.

Yablonovo (Stavropol) Field has two producing zones, 13 wells in 1938.

Sakhalin Fields and Prospects



4-CYCLE GAS-ENGINE COMPRESSORS

Six 800-hp Type KVG gas-engine-driven compressors on recycling service.

4-Cycle DEPENDABILITY
" " LOAD FLEXIBILITY
" " FUEL ECONOMY
" " LUBE-OIL ECONOMY
" " SIMPLICITY
" " CONSERVATIVE RATING

Whether the load is heavy and continuous . . . whether the pressures are steady, variable, or surging . . . whether the required speed is constant or fluctuating.

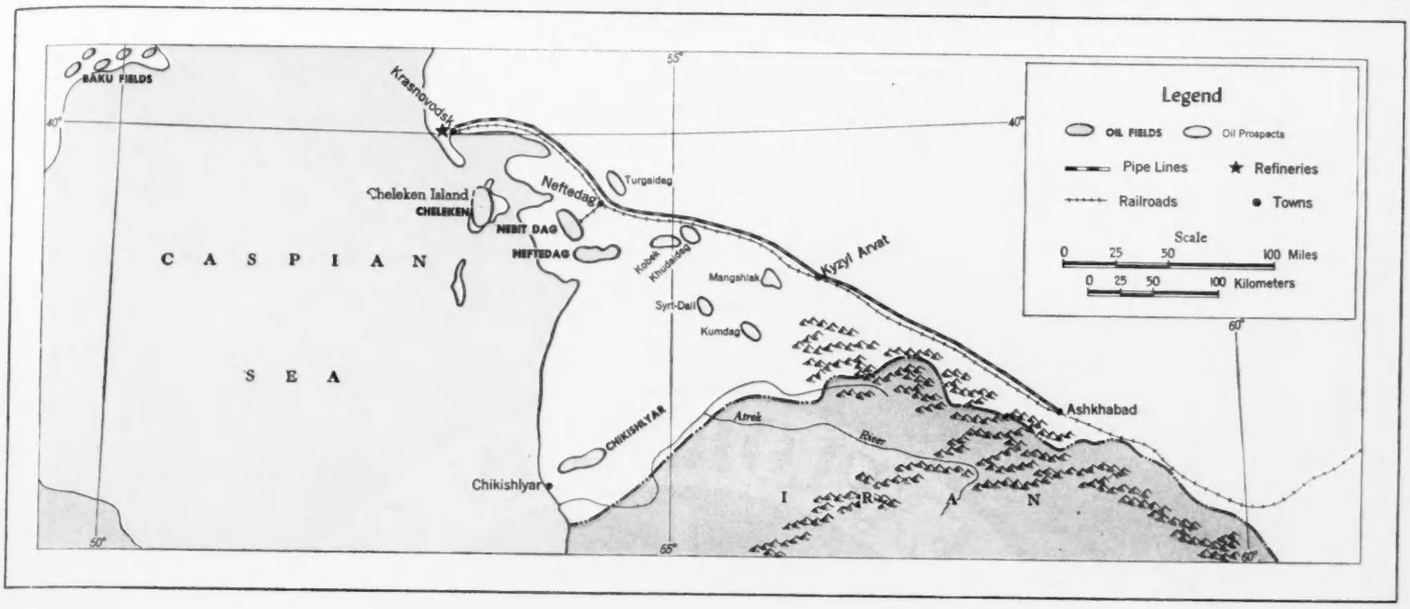
You **get these advantages in Ingersoll-Rand Gas Engines and Gas-Engine Compressors . . . Sizes 75 to 1200 horsepower**

Ingersoll-Rand

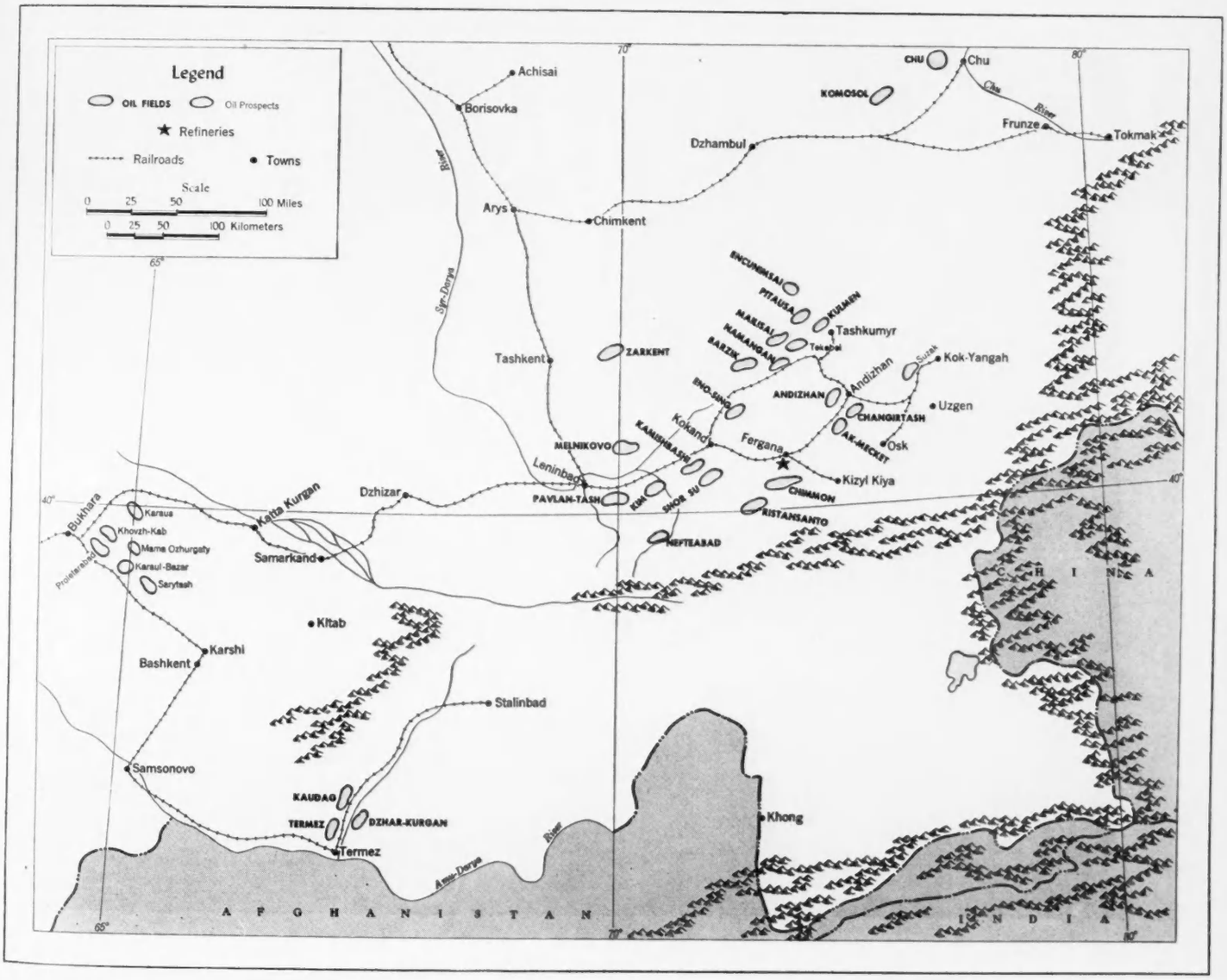
11 Broadway, New York 4, N. Y.

78-6

U. S. S. R.—Turkmen Fields and Prospects



Uzbek-Tadzik-Kirgiz Fields and Prospects



GEOPHYSICAL SURVEYS

ADVANCED EXPLORATION CO. Inc.

HOUSTON 2, TEXAS

ALGERIA

ALGERIA, with only one field currently producing small amounts of crude oil, is starting additional drilling in an effort to find new oil areas. The Service des Recherches Minieres, owned jointly by the French and Algerian governments, is embarking on a three-year program of exploration which will involve geological and geophysical work as well as wildcat drilling. As part of the program a light rig capable of 2500-foot drilling was placed in operation early in 1947, and two others to drill 4000 to 6000-foot wells were to be activated during the year. No wildcats had been drilled in Algeria for the past three years.

The Tliouanet field has produced only 228,000 barrels since discovery in 1914, and is now making only three to four barrels daily from the 12 wells being operated. It produces from Basal Miocene sands between 400 and 2000 feet deep in a proved area of only 30 acres. The Ain Zeft field was of even less importance, having produced only 21,000 barrels of oil since discovery in 1895.

A small refinery with capacity of 50 barrels a day is operated by the company in the Tliouanet field area, while another small plant at Azrew, 25 miles east of Oran, is shut down.

EGYPT

EGYPT'S exploratory campaign is showing definite results, and although the 1947 total production of 9,310,000 barrels was slightly less than the peak years of 1944 and 1945, it is likely that that figure will be exceeded in 1948 by more than two million barrels. Until the opening of the Sudr field on Sinai Peninsula late in 1946, no new fields had been discovered in Egypt since 1938, and the bulk of production had come from the Ras Gharib field on the west coast of the Gulf of Suez. During 1947 four additional wells were completed in Sudr and it went on production in December, shipping crude at the rate of 5000 barrels a day. The most recent 1947 completion on the south side of the new field was reported to have tested initially at a producing rate of 2800 barrels a day.

Some 10 miles south of Sudr, also on the east coast of the Gulf, a joint operation of the Anglo-Egyptian Oilfields, Ltd., and Socony-Vacuum Oil Company resulted in an apparent discovery at Asl, where a well was testing 90 barrels of oil daily from 3880 feet at the end of the year. It had not yet been officially completed, however.

Earlier in the year, Standard Oil Company of Egypt's Wadi Baba 1, on the east shore of the Gulf of Suez, and 125 miles south of Suez reported showings of heavy oil, and swabbed at the rate of 15 to 20 barrels of 11-gravity oil a day during testing operations. No official completion had been made of the well at the close of the year.

Of interest on the Hurghada structure, on the west shore of the Gulf and the most southerly field in Egypt, drilling resulted in finding of south flank production at a depth of 2525 feet. The well had not been completed at the close of the year, but early tests showed it capable of flowing 950 barrels a day. The production for this field at the close of the year amounted to only 1060 barrels daily from 48 wells.

Following the success on the Sinai Peninsula and through the Suez area, most of the exploration activity has been concentrated in those areas. As yet it is not practical to do much work in the northwestern desert area west of El Alamein on account of the presence of numberless land mines left by the various armies which fought over that region during the war.

Eight wildcats were drilled during the year, including the two which are showing evidences of opening new areas, and which are not yet finally completed. The exploratory program included an experimental seismograph party which was operated during 1947 for the joint interests of Standard of Egypt, Anglo-Egyptian Oil Fields, Ltd., and Socony Vacuum-Oil Company. In addition Socony and Standard of Egypt operated seismograph crews while Standard and Anglo-

Oil Production and Producing Wells in Egypt

Country and Field	Operating Company	Year of Discovery	Producing Oil Wells End of 1947: Shut In	Producing Oil Wells End of 1947: Flowing	Producing Oil Wells End of 1947: Art. Lift	Producing Oil Wells End of 1947: Total Producing	Crude Oil Production (Barrels): Daily at End of 1947	Crude Oil Production (Barrels): Year 1946	Crude Oil Production (Barrels): Year 1947	Crude Oil Production (Barrels): Cumulative Through 1947
Gemsa (abnd)	Anglo-Egyptian Oilfields, Ltd.	1908	1	..	..	..	.....	2,300	.....	1,420,000
Hurghada	Anglo-Egyptian Oilfields, Ltd.	1913	..	..	48	48	1,060	370,000	351,000	36,976,000
Ras Gharib	Anglo-Egyptian Oilfields, Ltd.	1938	17	24	71	95	29,300	8,540,000	8,847,000	69,086,000
Sudr	Anglo-Egyptian Oilfields, Ltd., and Socony Vacuum Oil Company	1946	..	4	1	5	*4,900	1,500	112,000	114,000
Total			18	28	120	148	35,260	8,913,800	9,310,000	107,596,000

* This is daily average from December 9, on which day field was opened.

Engineering and Geological Data on Egypt Fields

Country and Field	Proved Area (Acres)	Range of Gravity of Oil (A.P.I.)	Name	Kind	Age	Depth (Feet): Minimum to Top of Pay	Depth (Feet): Maximum to Bottom of Pay	Average Thickness of Pay (Feet)	Type of Structure
Gemsa (abnd.)	40	23	.....	Lime	Miocene	400	2000	100	Anticline
Hurghada	500	22-24	.....	Conglomerate and Sand	Miocene and Cretaceous	700	2500	100	Anticline
Ras Gharib	1000	25-26	Nubian	Sand Sand Lime	Carboniferous Cretaceous Miocene	1600 1600 1200	2500 2000 1900	400 75 300	Faulted Monocline
Sudr	....	22-24		Lime and Sand	Basal Miocene and Eocene	2650	3100		Anticline

Virtually every penny invested in drilling is spent for the sole purpose of locating an economically productive oil and gas formation. Time, labor, and equipment; land, geological, overhead, and general office expense; the total of all these costs must be balanced against the contents of a relatively minute portion of the total depth drilled.

Thus, the economical importance of making accurate selections of probable productive zones to be analyzed, yet eliminating the unnecessary additional expense of hit-or-miss coring, is obvious.

Core Lab's new service of Drill Cuttings Analysis in combination with On Location Core Analysis facilitates an economical coordination of drilling, coring, and core analysis, in three ways:

1. *Continuous analysis of drill cuttings eliminates "blind" coring and pinpoints probable productive zones.*
2. *Equipment and trained personnel are already available at the well site — without standby or demurrage charges — for immediate and accurate On Location Core Analysis for permeability, porosity, oil and water saturation, connate water, and gravity.*
3. *Overall coring and core analysis costs are reduced to a minimum.*

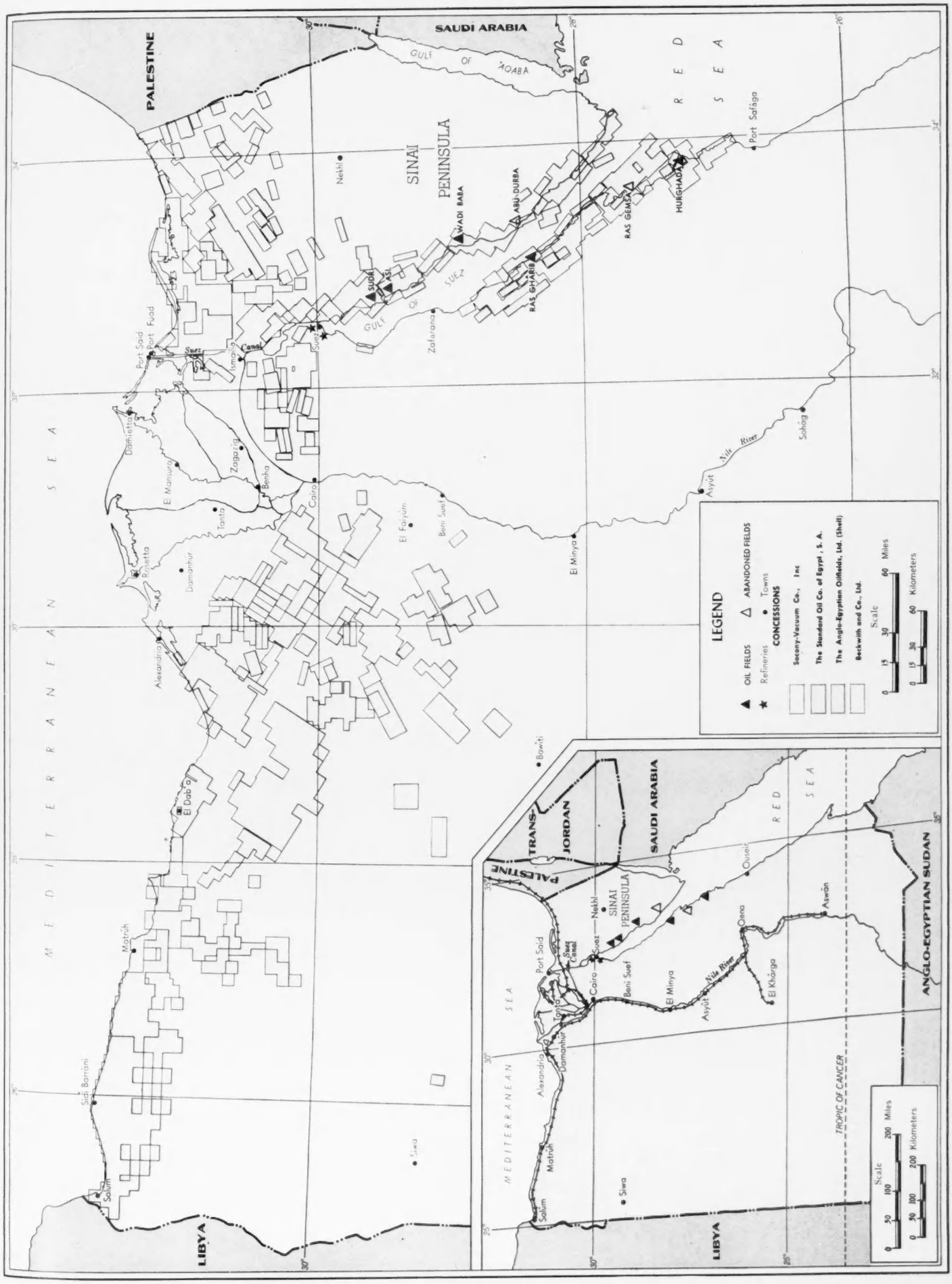
Core Lab: *first* in personnel; *first* in equipment; *first* in operating techniques; *first* in Petroleum Reservoir Engineering.

CORE LABORATORIES, INC. • DALLAS 11, TEXAS

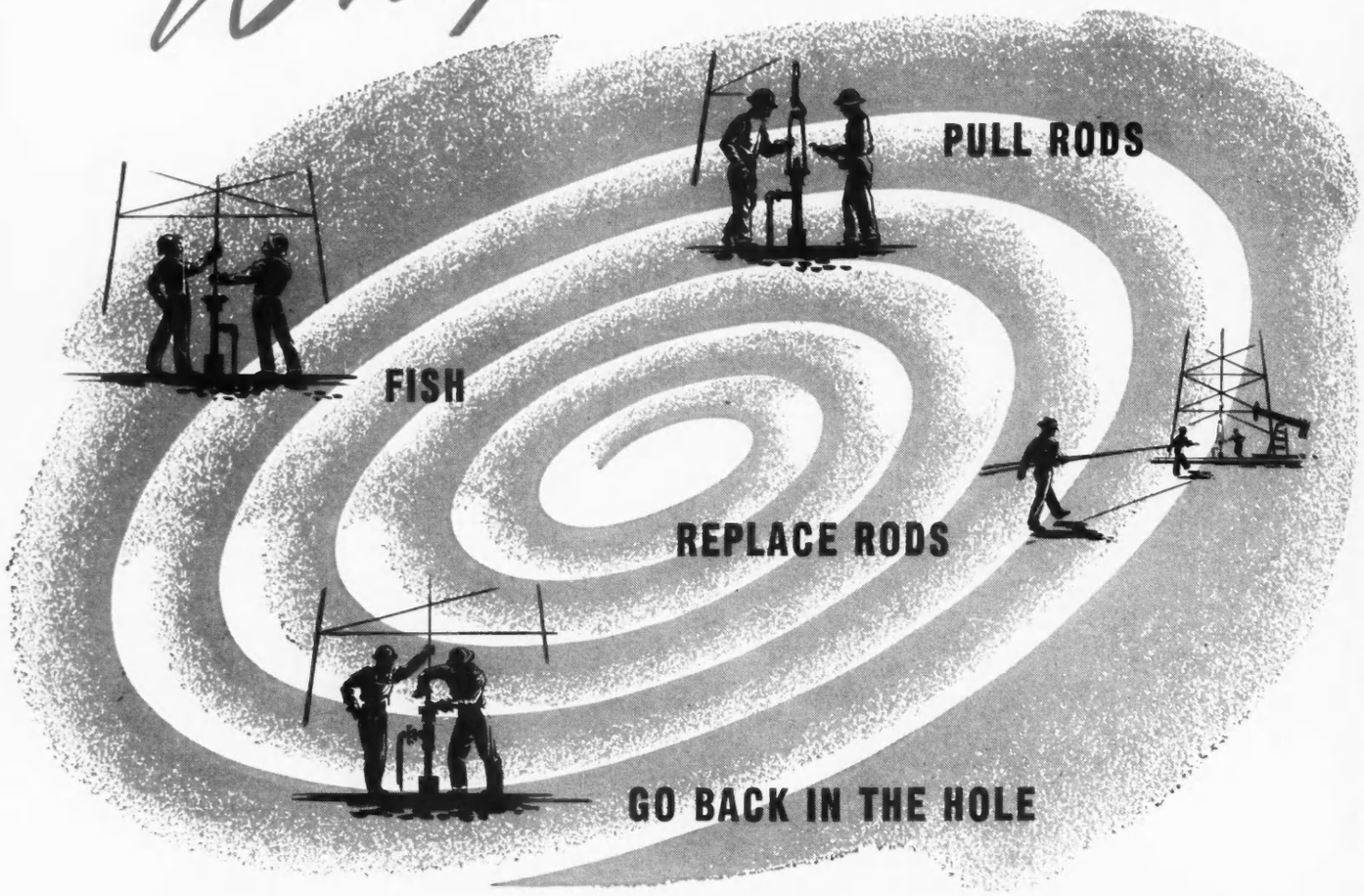
"If it's worth coring, it's worth analyzing."

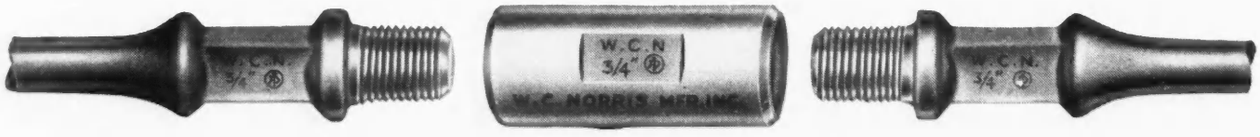
CORE LAB
PETROLEUM RESERVOIR ENGINEERING

EGYPT—Fields and Concessions



Why SPEND THE TIME TO...





For EVERY pumping job—sour or sweet, shallow or deep—use NORRIS FULL-LENGTH NORMALIZED SUCKER RODS. Down time due to inferior rods is lost time and money. Use only rods that are field tested and proven. Use only NORRIS SUCKER RODS. Made of the finest available steels and alloys, NORRIS SUCKER RODS are the result of 65 years' experience in the manufacture of quality oil field equipment. For complete information and specifications on NORRIS SUCKER RODS, POLISHED RODS, PULL RODS and COUPLINGS, write for Bulletin No. 28-B.

W.C. NORRIS, MANUFACTURER, INC.

TULSA, OKLAHOMA

BRANCHES:
HOUSTON, KILGORE, ODESSA, TEXAS; SALEM, ILLINOIS

EXPORT:
30 ROCKEFELLER PLAZA, NEW YORK CITY

Since QUALITY NORRIS PRODUCTS 1882

WEST COAST DISTRIBUTORS:
HICKEY SUPPLY COMPANY,
Los Angeles

EGYPT—Continued

Egyptian both operated gravitymeter parties. All of the companies maintained geological parties in the field.

In addition to the normal geophysical work, Anglo-Egyptian operated an under-water gravity meter crew in the Gulf of Suez where it was still working early in 1948. The same company had conducted a gravity survey on the Mediterranean coast between Alexandria and El Alemain. It is also drilling a series of core holes and slim-hole structure tests. Standard operated a core-drill crew throughout 1947. In the Gulf of Suez opposite the Sudr field, Socony-Vacuum Oil Company and Anglo-Egyptian, joint operators of the field, are likewise carrying on a joint gravity meter survey in underwater areas.

The three operating companies, which together held exploration and prospecting licenses on approximately 17¾ million acres, have taken out new permits on fill-in tracts during the year, and had increased their holdings to more than 19 million acres by the end of 1947. The property is about equally divided between the three companies, with Socony-Vacuum and Anglo-Egyptian holding some joint-interest permits.

During the war, the Shell interests built a 75-mile pipe line from Suez to Cairo at the instigation of the British army, but the line has not been used, although still in place.

Egypt's two refineries are both located at Suez, being supplied by water, and there are no major pipe lines used to transport crude oil. The fields are all near the Gulf of Suez and only short feeder lines are necessary to reach water transportation.

The largest refinery is operated by the Anglo-Egyptian and has a capacity of 35,000 barrels a day, including 4000-barrel cracking facilities. The other is operated by the Egyptian Government and has a current capacity of 1800 barrels daily. Present plans are to double the capacity of this plant.

Drilling in Egypt

	WELLS COMPLETED IN 1946				WELLS COMPLETED IN 1947				WELLS DRILLING AND SHUT DOWN AT END OF 1947		
			Total				Total				
Country & Field	Oil	Dry	Wells	Footage	Oil	Dry	Wells	Footage	Drilling	SD	Total
Gemsa (abnd.)	..	..	..	.....	..	..	..	.....	..	..	..
Hurghada	..	..	..	.....	..	..	..	.....	1	..	1
Ras Gharib	6	..	6	15,355	6	..	6	15,933	1	..	1
Sudr	1	..	1	3,157	3	..	3	21,388	2	1	3
Wildcats	..	9	9	48,929	..	6	6	33,049	2	..	2
Total	7	9	16	67,441	9	6	15	70,370	6	1	7

Wildcats Completed in Egypt in 1947

Territory	Company, Well and Location	Date Completed	Total Depth	Result and Formation
Eastern Desert	Anglo-Egyptian Oil Company's Abu Sultan 1, W side Great Bitter Lakes	9–6	2456	Abnd.—Jurassic
	Attaka 1, 9 miles nw of Suez	3–15	3938	Abnd.—Carboniferous
Gulf of Suez	Standard Oil Company of Egypt's Abu Rudeis 1, 19 miles s of Abu Zanima	3–28	7895	Abnd.—Miocene
	Anglo-Egyptian Oil Company and Socony Vacuum Oil Company's Nebwi 1, 47 miles s of Suez	8–30	8360	Abnd.—Cretaceous Nubian
Sinai	Hamra 1, 25 miles e of Suez	7–12	4790	Abnd.—Carboniferous
Western Desert	Standard Oil Company of Egypt's Abu Roash 2, 6 miles nw of Great Pyramids	1–31	5610	Abnd.—Jurassic
Total			33,049	

ETHIOPIA

UNSETTLED conditions in Ethiopia have caused Sinclair Petroleum Company to suspend its oil exploration operations early in 1948. Work had continued actively through 1947, with geological work having progressed to the point of selecting the first drilling site and moving in equipment to a spot near Ogaden, 350 miles from Diradawa where headquarters have been set up.

According to the concession agreement, Ethiopia was to furnish protection to workmen, and since the war Britain has maintained troops in Ogaden. Continued violence among the Somali tribes has led to destruction of equipment and threats to personnel. Britain said it could do nothing about the matter; American personnel has been drawn back to Diradawa, and will not return until protection is assured.

MOROCCO

DISCOVERY of a new field in the Rharb Basin of French Morocco was the most significant development in the territory during 1947. Only three commercial oil fields had been found before discovery of Oued Beth, the new field, and these had never produced in important quantities. At the end of 1947 the combined output from the three was only 38 barrels daily. Oued Beth was opened in November and is producing 113 barrels daily from 3420 feet. It has been variously estimated to have had initial potential upward of 1250 barrels daily, so this field may well be the most important in Africa outside Egypt.

Société Cherifienne des Pétroles has maintained an intense

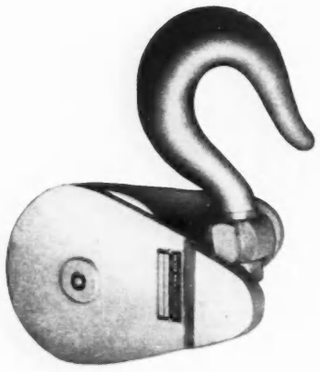
Engineering and Geological Data on Morocco Fields

PROVINCE AND FIELD	Proved Area (Acres)	Range of Gravity Oil (API)	PRODUCING FORMATION						Type of Structure
			Name	Kind	Age	DEPTH, (Feet) Minimum to Top Pay	DEPTH, (Feet) Maximum to Bottom of Pay	Average Thickness of Pay (Feet)	
PORT LYAUTEY									
Ain Hamra	300	45	Tortonian	Sand	Miocene	435	4674	9	Lenses
Dou-Draa Dou-Draa, North	340	45	Toarcian	Lime	Liasic	650	300	15	Anticline
Tselfat	130	44	Toarcien Domerien	Lime	Liasic	330	....	15	
			Domerien	Lime	Liasic	820	40	40	Anticlinal
			Domerien	Lime	Liasic	2625	5500	150	
Oued Beth	?	34.5	Burdigalien	Sandstone	Miocene	3280	3290	10	?

HACKER PRODUCTS

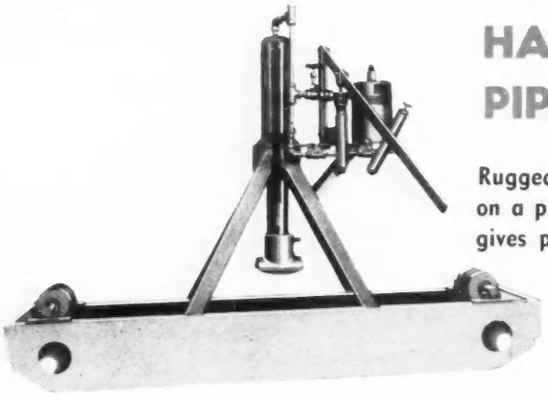
Designed to Save You Time and Money!

Here is tough, safe, economical equipment, designed and made by oil men for oil men. Years of field experience has proven that Hacker Equipment WILL save you money—start today, and write for your copy of the Hacker catalog!



HACKER SNATCH BLOCKS

This patented Hacker Steel Block is made in any size and type for drillers, rig builders, truckers and construction contractors. The quick-opening positive latch is fool-proof, because it can only be opened when the hook is in a crosswise position (left). Drop forged steel hooks. Machined steel sheaves equipped with bronze or roller bearing. 4", 6", 8" and 10" sizes.

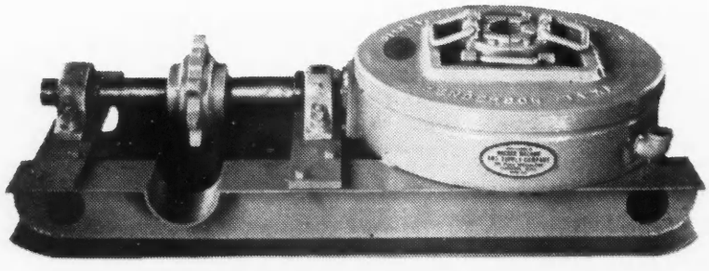


HACKER HYDRAULIC PIPE STRAIGHTENERS

Rugged and powerful, yet compact enough to be easily hauled on a pick-up truck. Exclusive speed feature of booster pump gives plunger fast action, and doubles the quantity of pipe that can be handled. Shoes to fit any size pipe to capacity limit. Model No. 6 pictured to 12" capacity. Model No. 4 to 8" capacity.

HACKER OILBATH ROTARY

Here is a rugged all-steel, all-welded oilbath rotary that is recommended for servicing and drilling plugs in wells to 5000 feet, or drilling oil or water wells to 1800 feet. Slushproof, oilbath feature affords quiet, long-life operation. Table opening 10". Also available in conventional type.



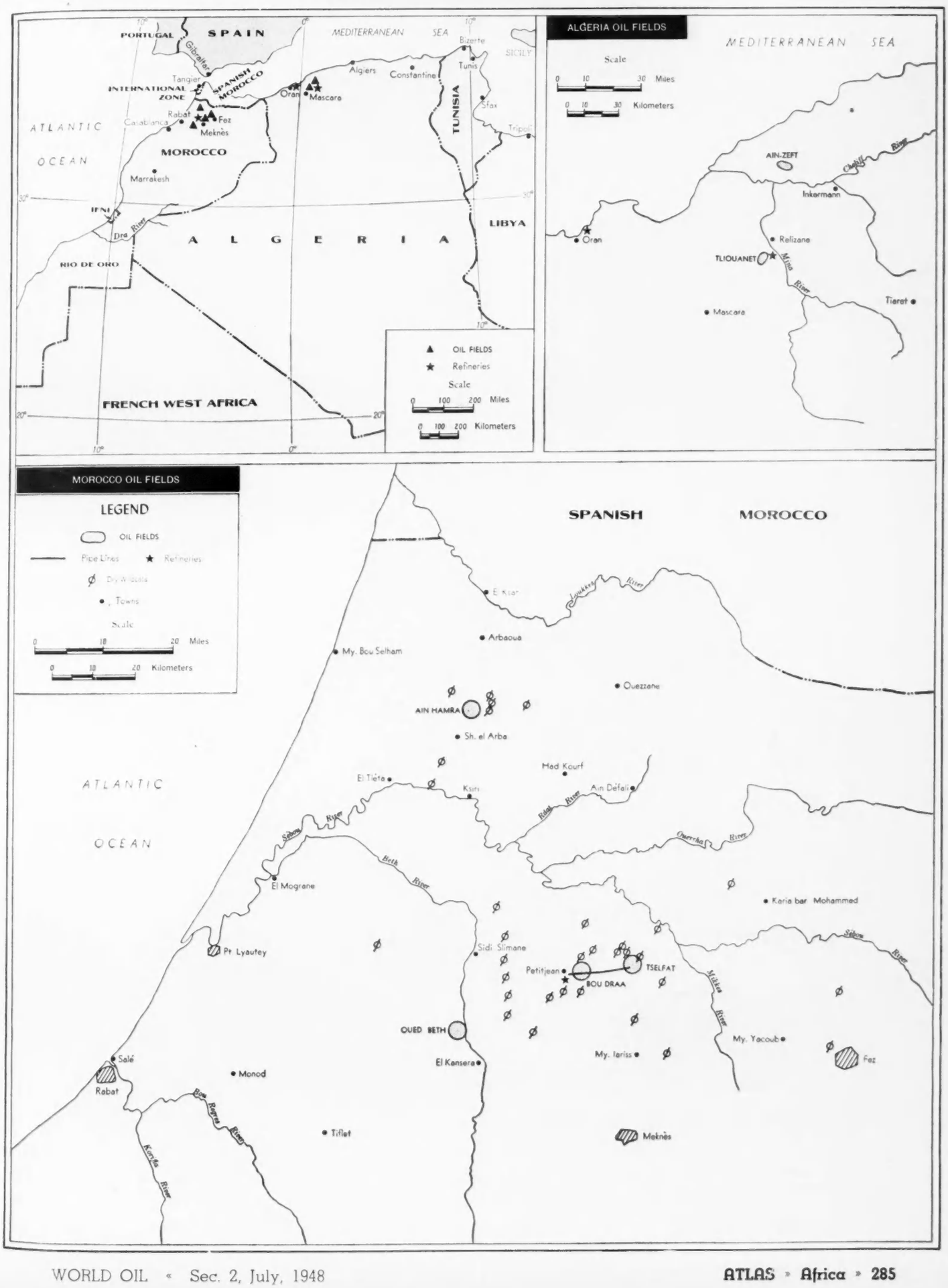
OTHER HACKER PRODUCTS:

Casing Testing Pumps, Oilbath Swivels, Tubing Bowls and Slips, Kellys.

SOLD THROUGH SUPPLY STORES

Manufactured by
HACKER MACHINE & SUPPLY CO.
Phone 440
HENDERSON, TEXAS, U. S. A.

ALGERIA and MOROCCO



Best by TEST

Century UNITIZED GEOPHYSICAL EQUIPMENT

The Century Recording Truck is a completely self-contained unit. And all components are designed and manufactured by Century. The operator has within easy reach finger-tip control of all his instruments.

The Century All-Hydraulic Drill is the industry's most modern shot hole drill. This is another complete unit offered by Century.

These are two of the units which comprise Century Unitized Geophysical Equipment.

Century

CENTURY GEOPHYSICAL CORP.

TULSA, OKLAHOMA

NEW YORK
149 Broadway

HOUSTON
Niels-Esperson Building

MOROCCO—Continued

exploratory program throughout the year, drilling a total of 34 wildcat wells in addition to the geological and geophysical work continued since the close of the war. Toward the end of 1947 five new drilling rigs had been received from the United States. All drilling had been concentrated on the search for new reserves with no field wells completed. The Oued Beth field was opened with the seventh well drilled on the prospect, following slight showings in the initial wildcat earlier in the year. Plans call for rapid development of the new field in addition to continued wildcatting in the light of information gained from the discovery.

The Société Cherifienne des Pétroles is owned jointly by the French and Moroccan governments, and its prospecting and development permits cover a total of 3,700,000 acres. It operates a small refinery at Petitjean which is capable of processing 200 barrels daily.

Pipe Lines in Morocco

COMPANY	Origin	Terminus	Length (Miles)	Diam. (Inches)	Capacity (Bbls. Daily)	Status
Société Cherifienne des Pétroles	Bou Draa	Petitjean	1	2	280	In Use
	Tselfat	Petitjean	12.3	2	280	In Use
	Ain Hamra	Karia (railway)	2.3	2	150	In Use
Total	3 Lines		15.6		710	

Oil Production and Producing Wells in Morocco

Province and Field	Year of Discovery	Producing Oil Wells End of 1947			Crude Oil Production (Barrels)			
		Flowing	Art. Lift	Total Producing	Daily at End of 1947	Year 1946	Year 1947	Cum. Through 1947
Port Lyautey								
AinHamra (Soukel-Arba)	1918	..	22	22	6	8,200	5,900	50,900
BouDraa	1936	..	21	21	20	7,000	5,500	156,500
BouDraa, North								
Oued Beth	1934	..	17	17	12	4,500	3,960	124,960
Tselfat	1947	1	..	1	113	.....	5,650	5,650
Total	.....	1	60	61	151	19,700	21,010	338,010

NOTE:—All operations by Société Cherifienne des Pétroles.

Wildcats Completed in Morocco in 1947

WELL, LOCATION	Date Completed	Total Depth (Feet)	RESULTS
PORT LYAUTEY			
Société Cherifienne des Pétroles			
Oued Hamma—6 miles SE of Sidi Silmane			
Oued Hamma—2	Jan.	4280	Water and Gas showings, Helvetian
8	May	810	Dry, Tortonian
9	June	1970	Dry, Tottonian
10	July	1970	Dry, Tortonian
4	Nov.	3420	Junked—Helvetian
4-A	Dec.	530	Shut down—lack of mud products
Oued Beth—12 miles south of Sidi Slimane			
Oued Beth— 2	May	4180	Dry, Cretaceous
3	Aug.	5250	Abandoned—Helvetian—heaving shales
6	Aug.	3780	Dry, Primary
1	May	3850	Tested 6 bbls. oil daily, Basement —dry, Cretaceous
4	Sept.	4190	Dry
7	Nov.	3420	115 bbl./daily oil, Basement. Discovery
Sidi Hassin—8 miles NE of Souk el Araba			
Sidi Hassin 1	Aug.	1720	Gas showings, Eocene
Fokra—9 miles NF of Souk el Arba			
FO—8	Feb.	1370	Dry, Oligocene
12	Mar.	1420	Dry, Cretaceous
13	April	640	Dry, Cretaceous
14	April	1110	Dry, Lutetien
15	May	1590	Dry, Cretaceous
16	June	1400	Dry, Cretaceous
17	July	960	Dry, Cretaceous
Maria Daouia—12 miles west of Souk el Arba			
KD—4	April	820	Dry, Sahelien
5	May	730	Dry, Tortonien
6	June	820	Dry, Tortonien
7	July	840	Dry, Sahelien
8	July	340	Dry, Tortonien
Petitjean-Kairi—5 miles NW of Petitjean			
PK—1	June	3950	Dry, Tortonien
2	July	3950	Dry, Tortonien
Jalla Zorha—12 miles NW of Souk el Arba			
LZ—2	Aug.	830	Dry, Tortonien
1	Sept.	930	Dry, Helvetian
3	Oct.	790	Dry, Helvetian
4	Nov.	610	Dry, Helvetian
Anabar—8 miles NE of Souk el Arba			
AN—1	Sept.	1410	Dry, Salt
Oued Mimoun—7 miles east of Souk el Arba			
OM—1	Oct.	1320	Dry, Cretaceous
Grouna—12 miles north of Souk el Arba G.R.I.	Dec.	1640	Dry, Cretaceous
Total ..... 34 Wells		67,840	

TUNISIA

THE Tunisian Syndicat d'Etudes et de Recherches Pétrolieres, operating agency owned by the French government, holds concessions on 389,272 acres in three separate areas of Tunisia in the Ferryville area, the Cap Bon and Bordure Sahel and the Central-South. Seven different prospects had been drilled since the company started operations in 1931, all unsuccessful, but geological work has been accelerated during the year, and two new rigs have been acquired. The first new heavy rig was started in October on the Ain Rhélal structure near Ferryville, and the second was scheduled for a wildcat at Cap Bon early in 1948. Future drilling plans on these prospects will await completion of the deep wells.

Meanwhile geological work will be pursued in the Central and South areas, and a gravitymeter survey will be completed in the Le Sahel area. Also scheduled is a program of core-drilling with a light portable rig just received.

OTHER AFRICA

NEAR the Algerian frontier, in Libya, it has been reported that important evidences of oil accumulations have been found in the Fezan region. The area is south of the oasis of Murzek in a region occupied by the French since the end of the North African Campaign in 1944.

In Portuguese East Africa concession rights have been granted to Manica Trust, Ltd., a British-Portuguese firm, to conduct geological and geophysical investigations in Mozambique. As early as 1927 showings of oil were found in shallow tests drilled in the area by the Inyaminga Petroleum, Ltd., of South Africa.

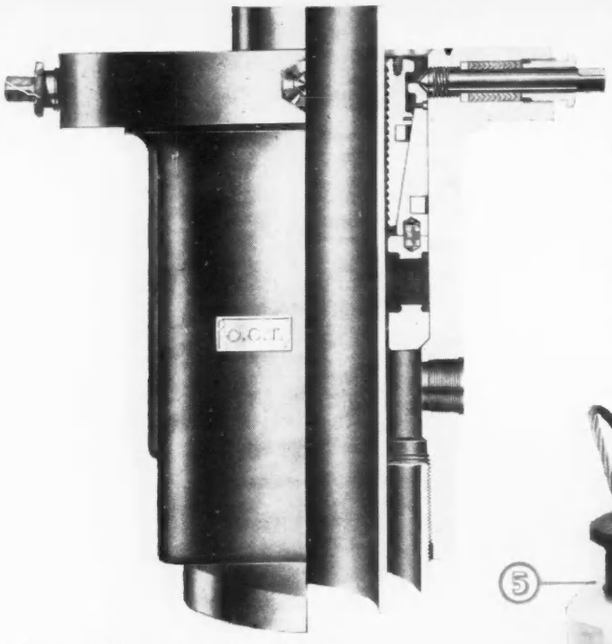
It is reported that F. I. Nevill, Inc., have secured exploration rights on a considerable area in the Union of South Africa and Rhodesia, covering the watershed of the Limpopo River. Some geological work has been carried out in the area since before the war, and plans are under way to move in drilling equipment for a series of wildcat tests.

In South Africa oil has not yet been found in commercial quantities, but it has been hoped that drilling in the Bethal, Ermelo, and Wakkerstroom districts of the Transvall being carried on by the Department of Mines, will give information leading to possible discovery. The investigations are being carried on in areas where Torbanite is mined and refined into petroleum products.

ANNOUNCING

the new O-C-T *type* "C-19" WELL HEADS

with distinctive new features for quick setting, positive-sealing, and safe suspension of long, heavy casing strings.



The O-C-T Type "C-19" Casing Head combines the time tested and well known casing weight seal of the O-C-T Type "C-9" Head with new and simplified setting procedure. It provides:

Fast, Easy Installation: Slips, packing element and bowl are a single split unit that is wrapped around casing, latched and dropped into head with elevators holding desired tension on casing.

Self-setting: Upon reaching its seat in casing head body, suspension at desired tension and a seal are automatically effected. A positive seal is established as weight of casing is applied to Hycar packing assembly.

Safe: The "C-19" hanger may be dropped into head through blowout preventers, automatically effecting a seal around oil string before disturbing preventer connections. Eliminates blowouts from above top of cement around oil string.

Permanent: Hycar seal totally enclosed by steel.

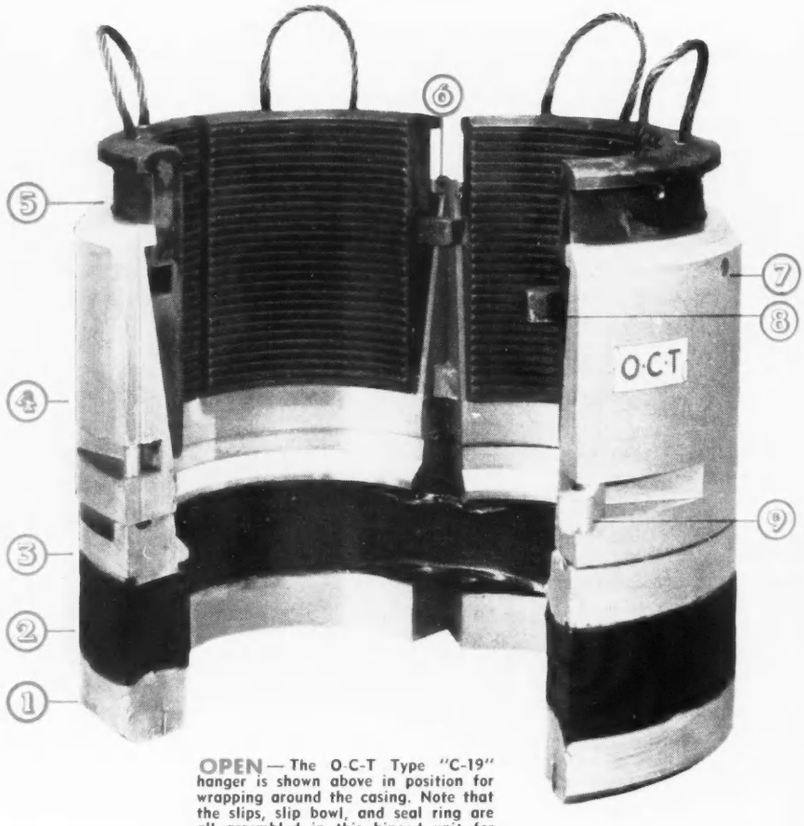
High Load Capacity: Heavy duty, even-set slips will carry pull-out rating of casing joints. Recently 520,000 lb. of $9\frac{5}{8}$" casing weight, buoyancy deducted, was hung on an O-C-T head of this type.

DETAILED DESCRIPTIVE BULLETIN ON REQUEST

1 Lower packing retainer ring, hinged.
2 Hycar (oil, gas, and heat-resistant) seal ring.
3 Upper Packing retainer ring, hinged.

4 Split slip bowl, hinged.
5 Slip segments assembled in hinged bowl.
6 Hinged construction for easy assembly around pipe.
7 Slip retainer screws.
8 Slip alignment bar.
9 Slip bowl latch for securely fastening hanger assembly around casing when the hanger is to be dropped through the preventer assembly.

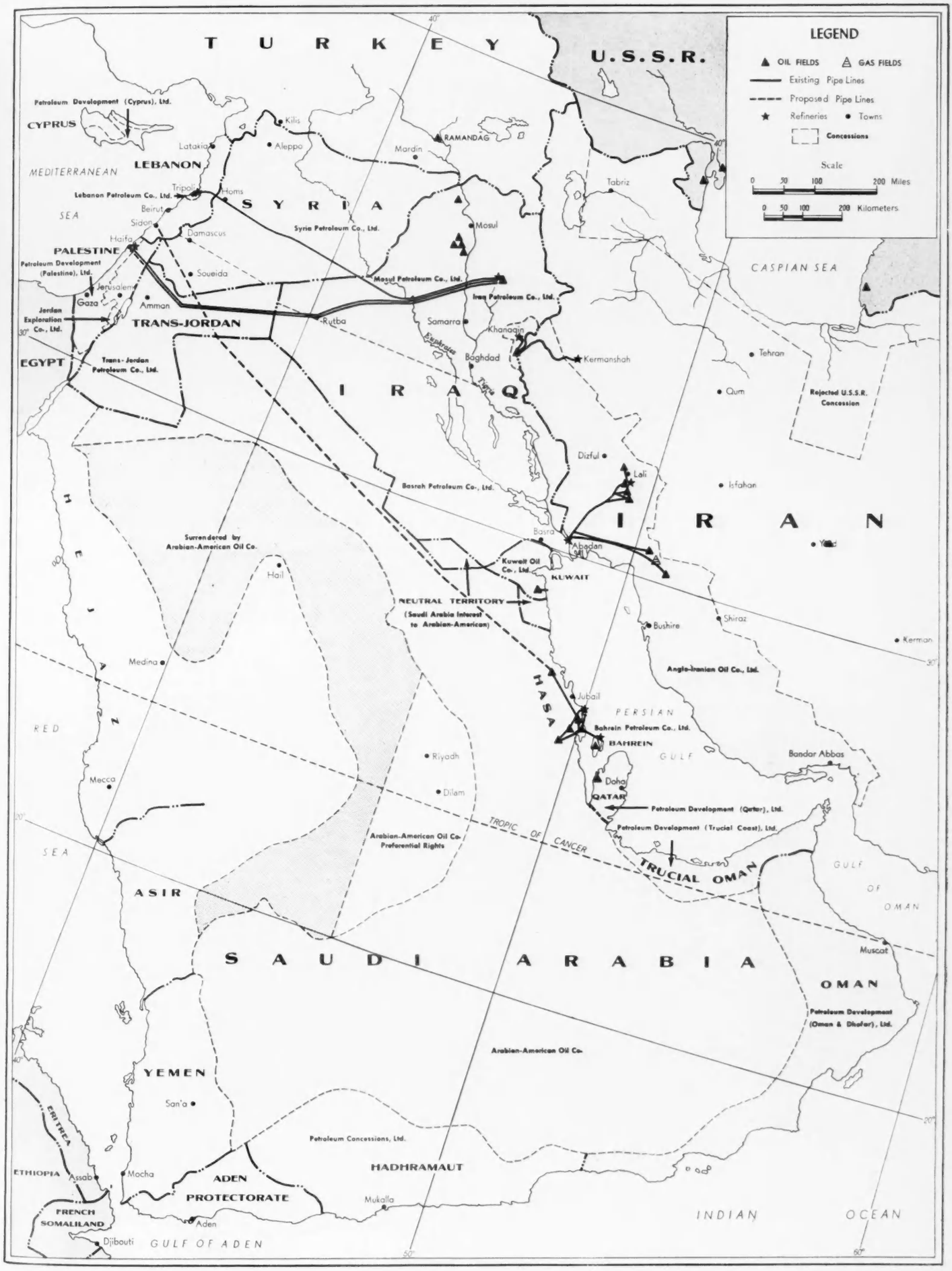
SHUT — View of the Type "C-19" hanger latched around a joint of pipe. In this position, with slip retainer screws removed the hanger assembly will ride freely over the casing to its seat in the well head. Slacking off on the elevators will automatically hang the pipe in the slips and expand the seal ring.



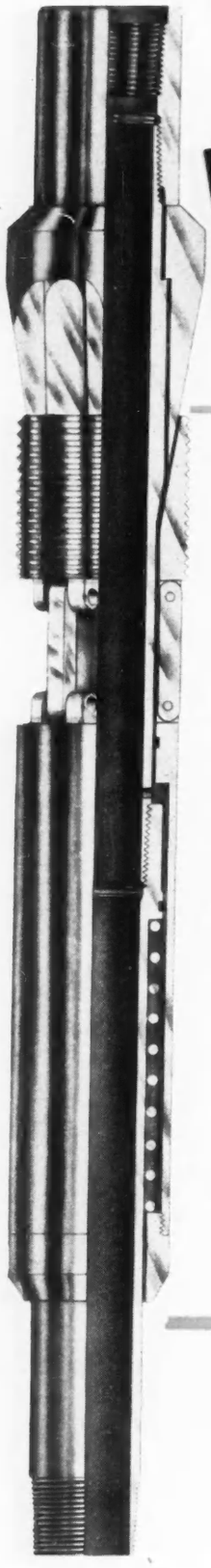
OPEN — The O-C-T Type "C-19" hanger is shown above in position for wrapping around the casing. Note that the slips, slip bowl, and seal ring are all assembled in this hinged unit for quick and easy installation.

OIL CENTER TOOL CO. • Houston, Texas

MIDDLE EAST—Concessions



Are you interested in staying "on pump" 4 to 5 TIMES LONGER?



ACTUAL FIELD RECORDS

Actual field records on every Page installation prove conclusively that anchoring the Page Way—in Pre-Set Tension—keeps tubing in the hole from 4 to 5 times longer than anchoring by conventional "catcher-type" Tubing Anchors!

Then check this NEW PAGE WAY OF ANCHORING TUBING in PRE-SET TENSION!

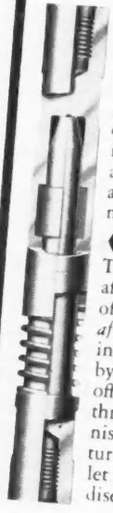
Page Tension Type Tubing Anchors set *and hold* tubing in Pre-Set Tension to provide a better, more efficient anchorage than is possible by conventional, mechanically-operated Tubing anchors. Its unique spring-retracted, hydrostatically-set slip design eliminates drag springs and mechanical setting devices to assure full run-in of tubing without danger of pre-setting slips.

Anchoring "IN PRE-SET TENSION" - - The Page Way

Tubing is landed at the surface and elongated by slacking off rod weight against the pump shoe. The tubing is then completely filled with fluid to create a hydrostatic head pressure within the Tubing Anchor. The pressure thus created enters a piston chamber to cause an upward thrust on the annular slip piston to engage slips and a downward thrust on the tubing to pull the cone of the Anchor into the slips. Once set, slips are held in hydraulic tension by fluid present in the tubing string.

The V-cut design of each slip segment plus their being locked in hydraulic tension provides equal resistance against *both* up and down tubing travel, *regardless of pumping conditions*. Release requires only bleeding the tubing to permit retraction of slips by a helical spring.

OTHER New Design PAGE PRODUCTION TOOLS



PAGE TUBING DRAIN & BUMPER SUB →
Here's a Combination production tool that gives you both an efficient Tubing Drain and an effective up-jar Bumper Sub—whichever you desire at any given moment. Run in immediately above the tubing anchor or packer, this tool can be actuated by simple top-hole manipulation of tubing string.

← PAGE ON AND OFF ATTACHMENT
The Page On and Off Attachment affords a quick, positive method of joining sucker rods to pump *after* run-in of tubing or, effecting instant release when pump is stuck by sand or scale. Getting on and off is simple and safe—there are no threads to gall, no complex mechanism to foul up. Let down and ¼ turn left torque engages the tool—let down and ¼ turn right torque disengages the tool.

There are many more exclusive features in this entirely new type Page Tubing Anchor—write today for full descriptive literature or see your 1948 Composite Catalog . . . Pages 3322 to 3325 inclusive.

PAGE OIL TOOLS, INC.

P. O. Box 7126, Bixby Knolls Station, Long Beach 7, California

PAGE TENSION TOOLS

Trade-Mark Registered

MIDDLE EAST—Summary

MIDDLE EAST oil, sorely needed by the world to meet soaring demands, was available in increased amounts during 1947, and at the end of the year was being produced at a rate of 958,400 barrels daily, more than 176,000 barrels a day higher than production rates at the end of 1946. At the same time it was feared that output had reached a point very near the optimum limit of transportation facilities. The several pipe line projects, both under construction and proposed, received severe setbacks during the year as a result of the current political turmoil in most of the Arab states. Iraq Petroleum's line from Kirkuk to Haifa, to double deliveries to the Mediterranean, was halted within a few weeks of completion; Trans-Arabian Pipe Line Company's big line from the Persian Gulf fields of Saudi Arabia has suspended operations except in the vicinity of the fields themselves until such time as it is thought advisable for it to continue; plans for the Middle East Pipe Line Company's outlet from the Abadan area have been shelved for the same reasons. At the same time drilling activity has been sharply accelerated in all of the producing countries of the area, and potential producibility of the area is thought to be already sufficient to take care of any demand within reason.

The producing ability of the Middle East is illustrated by the fact that the 958,000 barrels daily production at the end of 1947 was coming from no more than 159 wells in all the fields, or an average of more than 6000 barrels daily per well.

Postwar availability of materials has made expansion general in all branches of the industry. Capacity of refineries has been steadily increased, pipe lines constructed, port facilities built and enlarged, and new fields brought into production.

Each country has brought new area into production to strengthen its reserve position, and a greater portion of the region's reserve can now be considered actually proved rather than indicated. Some 19½ billion barrels are now considered as the proved reserve of the Middle East, with another 10½ billion in the indicated or semi-proven category.

Middle East Crude Production and Reserves

COUNTRY	DAILY OIL PRODUCTION				RESERVES (Billions of Barrels)	
	Average 1946	End of 1946	End of 1947	1950-51 if Projects Completed	Actually Proved	Additional Indicated
Iran	401,000	425,000	472,000	800,000	5½	1
Iraq	90,000	90,000	91,400	270,000	5	1
Kuwait	19,000	33,000	62,000	100,000	4½	5
Saudi Arabia-Bahrein	188,000	234,000	333,000	650,000	4	2½
Qatar	.....	.....	.....	.....	½	½
Totals	698,000	782,000	958,400	1,820,000	19½	10

IRAN

IRAN maintains its position as the top producing country of the Middle East with an output of 154,861,000 barrels during 1947, compared with 146,888,700 barrels in 1946. Increases in operating capacity have been effected in the huge refinery at Abadan, which, along with slightly increased tanker availability have made possible the increases in the flow of crude oil from the fields. At the close of 1947 the total output was at the rate of 472,000 barrels daily. The Abadan refinery is now rated at 420,000 barrels daily crude charging capacity, with 125,000 barrels cracking capacity.

Iran's top producing field is still Haft Kel whose production of 68,804,000 barrels reflects an increase of almost 1¼ million barrels over 1946. Agha Jari, Masjid-i-Sulaiman, Gach Saran, Naft Safid and Naft-i-Shah follow in that order. During the year the official name of the White Oil Springs Field was changed to Naft Safid, and will be carried as such henceforth.

Refineries of Iran

COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery	Operating Status
Anglo-Iranian Oil Co.	Abadan	420,000	125,000	Complete except for Lubes and Waxes	Operating
Kermanshah Pet. Co. (Anglo-Iranian)	Kermanshah	2,100	None	Skimming	Operating
Totals		422,100	125,000		

Of particular significance during the year was completion of a well in the Lali field making 28,000 barrels daily which confirmed evidence furnished by its first well in 1946, and indicated it can hold its own with the other Iranian fields. A pipe line has been constructed and the field was to be placed on production early in 1948.

At Agha Jari three new wells were completed in 1947, and a northwest extension to the producing area was proved and connected into the pipe line system. No new wells have

Oil Production and Producing Wells in Iran

Province and Field	Year of Discovery	Producing Oil Wells End of 1947		CRUDE OIL PRODUCTION (Barrels)			
		Flowing	Total Prod.	Daily at End of 1947	Year 1946	Year 1947	Cumulative Through 1947
Fars:							
Gach Saran	1928-37	3	3	38,000	13,983,000	13,124,000	75,800,000
Kermanshah:							
Naft-i-Shah	1923	2	2	3,000	754,100	1,038,000	9,600,000
Khuzistan:							
Agha Jari	1937-38	12	12	144,000	30,668,300	45,639,000	94,300,000
Haft Kel	1928	23	23	197,000	67,585,300	68,804,000	749,500,000
Lali	1946	..	..	.....	.....	.....	.....
Masjid-i-Sulaiman	1908	29	29	73,000	28,356,300	21,314,000	793,300,000
Naft Safid (White Oil Springs)	1934-38	2	2	17,000	5,298,900	4,942,000	12,800,000
Pazanun (Condensate)	1937	..	..	.....	242,800	.....	6,500,000
Totals		71	71	472,000	146,888,700	154,861,000	1,741,800,000

Drilling in Iran

Province and Fields	WELLS COMPLETED IN 1946					WELLS COMPLETED IN 1947					Wells Drilling and Shut Down at End of 1947		
	Oil	Gas	Dry	TOTAL Wells	TOTAL Footage	Oil	Gas	Dry	TOTAL Wells	TOTAL Footage	Drlg.	SD	Total
Khuzistan													
Agha Jari	3	....	....	3	3,880*	3	....	....	3	19,195	2	....	2
Haft Kel	2	....	....	2	3,880*	....	....	....	....	.....	....	....	....
Lali	1	....	....	1	763*	1	....	....	1	6,614	2	....	2
Naft Safid (White Oil Springs)	....	....	....	....	....	1	....	....	1	6,335	1	....	1
Totals	6	....	....	6	8,523*	5	....	....	5	32,144	5	....	5

* Footage for 1946 only.

For the past 29 years, Guiberson drilling and production tools have followed close behind exploration—for wherever men seek oil, Guiberson tools serve safely and efficiently.

This continued leadership among men who demand the finest is possible only because Guiberson tools *are* the finest. Every item that carries the famous Guiberson trade-mark goes through a rigid period of field testing before it is offered for sale . . . your assurance that in the future, as in the past, the name "Guiberson" will stand for the best.

- Tubing Swabs
- Casing Swabs
- Sucker Rod Strippers
- Tubular Jars
- Plain and Swivel Rope Sockets
- Wire Line Oil Savers
- Tubing Catchers
- Tubing Anchors
- Tubing Spiders
- Control Head Packers
- Cup Packers
- Spiral Packers
- Combination Tubing Stripper and Spider
- High Pressure Tubing Strippers
- Drill Pipe and Tubing Oil Savers
- Rotating Drilling Heads and Strippers
- Quick Change Unions
- Combination Drilling Head and Rotary Table
- Automatic Flow Valves
- Blocks and Hooks
- Kellys
- Swivels

Guiberson U. S. A.
DALLAS, TEXAS
THE GUIBERSON CORPORATION
ESTABLISHED 1919

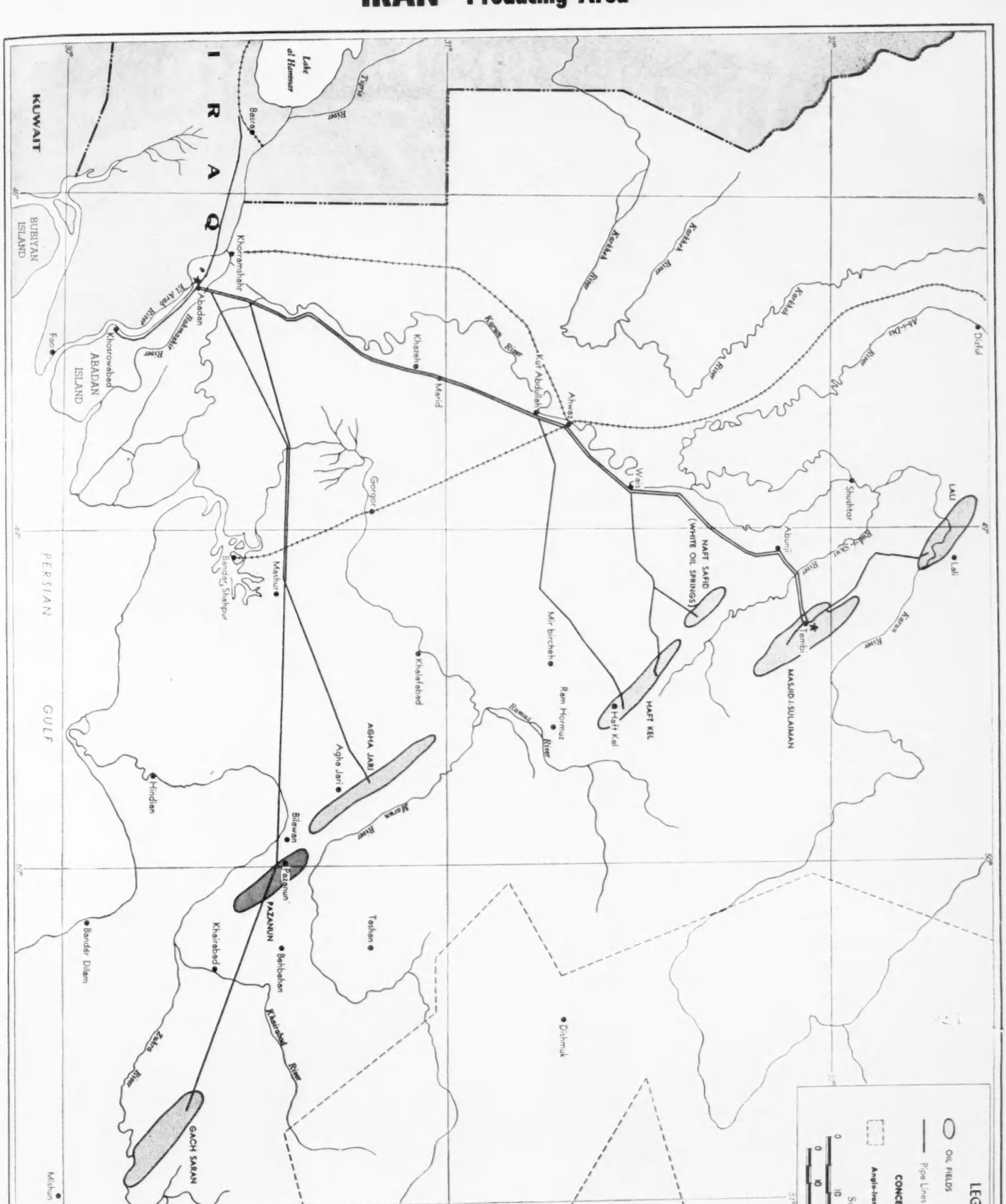
SAFE THAN SORRY BETTER BE GUIBERSON

Branch Offices in: Oklahoma City and Tulsa, Oklahoma; Longview, Kilgore, Houston, Alice, Odessa and Wichita Falls, Texas; Lafayette, Louisiana; Wichita, Kansas; Newark, Ohio.

Export Offices: 30 Rockefeller Plaza, New York 20, New York

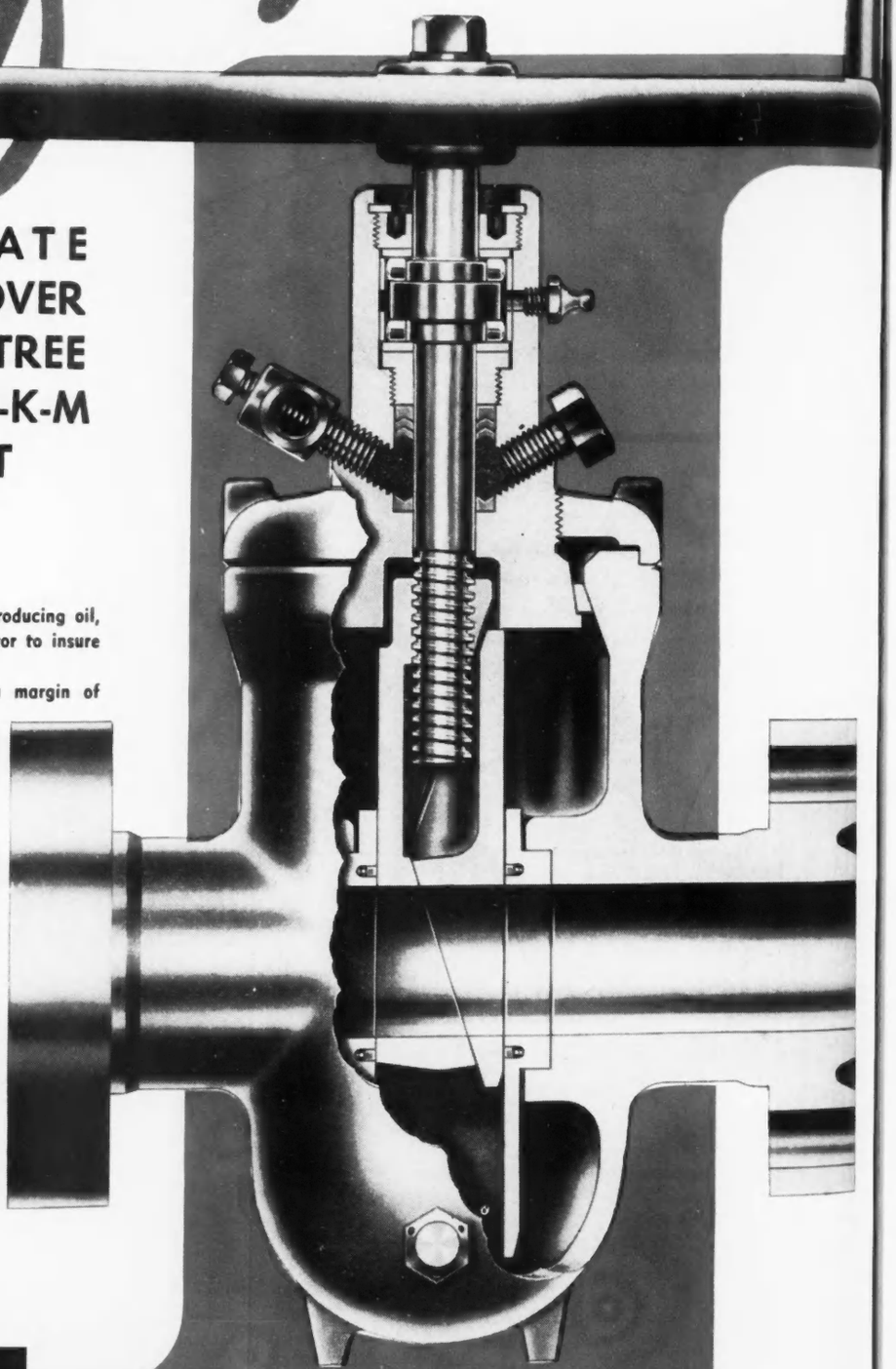
California Distributor: The W. R. Guiberson Co., 717 East Gage Avenue, Los Angeles 1, California

IRAN—Producing Area



YOU NEED THIS MARGIN OF *Safety . . .*

1500 2000 3000 4000 5000 6000 7000 8000 9000 10,000



PUT MASTER-GATE PROTECTION ALL OVER YOUR CHRISTMAS TREE HOOK-UPS WITH W-K-M THROUGH-CONDUIT GATE VALVES

THROUGHOUT every phase of drilling and producing oil, every possible precaution is taken by the operator to insure maximum safety for the investment.

On your Christmas Tree controls, the extra margin of safety that W-K-M Through-Conduit Gate Valves provide can mean the difference between safe and "half-safe" control.

It's a fact that when you suddenly need master gate safety all over your Christmas Tree controls, nothing can take the place of dependable, positive sealing W-K-M Valves.

Your well is most securely controlled by W-K-M Valves as Master Valves. Why not use W-K-M Master Gate Safety *all* the way instead of some miscellaneous or supplementary gadget?

In the long run, W-K-M Gate Valves are the most economical and by far the safest means of controlling high or low pressure wells.

So specify dependable W-K-M Gate Valves throughout your Christmas Trees for safety, service and economy . . . for complete safety at every point of control.

You need this extra margin of safety.

W-K-M Company, Inc.

OIL FIELD PIPE LINE & INDUSTRIAL EQUIPMENT

HOUSTON, TEXAS, U. S. A.
LOS-ANGELES

Cable Address: "WILKOMAC"
Export Office: 30 Rockefeller Plaza, New York, N. Y.

IRAN—Continued

been drilled at Gach Saran, where the production rate of 38,000 barrels daily is being maintained from three wells.

Under the agreement of December 26, 1946, Standard Oil Company and Socony-Vacuum Oil Company will purchase substantial quantities of crude from Anglo-Iranian Oil Company over a period of 25 years. In connection with this agreement the two American companies will also participate in the building of the huge 34-36 inch pipe line for which purpose the Middle East Pipe Line Company was formed. The plans for the pipe line, which was to have a capacity of 525,000 barrels daily, have been postponed until such time as the political situation makes feasible the allocation of the huge amounts of steel required for a line from Abadan to the Mediterranean.

During the year the Iranian Parliament rejected the agreement whereby the Soviet Government was to obtain a huge concession across the north end of Iran near the Caspian Sea.

Crude Oil Pipe Lines of Iran

COMPANY	Origin	Terminus	Length (Mi.)	Diam. (Inches)	Capacity (Bbls./ Day)	Year Completed	Status
Anglo-Iranian Oil Co., Ltd.	Masjid-i-Sulaiman	Abadan	133	10" & 12"	80,000	1916-1917	Operating
	Haft Kel	Abadan	136	12"	205,000	1929 to 1938	Operating
	Haft Kel	Marid	124	12"			
	Haft Kel	Kut Abdullah	61	12"			
	Naft Safid	Wais	32	10" & 12"			
	Agha Jari	Abadan	97	12"	176,000	1945 to 1948	Operating
	Agha Jari	Mashur	42	12"			
	Gach Saran	Abadan	166	12"	40,000	1940	Operating
	Naft-i-Shah	Kermanshah	146	3"	2,600	1935	Operating
	Lali	Masjid-i-Sulaiman	40	8"/10"/12"	11,000		Under Constr.
	Naft Khaneh	Alwand	24	6"/4"	8,600	1927	Operating
Totals....			1,001		523,200		

Engineering and Geological Data on Iran Fields

Province and Field	Proved Area (Acres)	Gravity Oil (API)	Name	Kind	Age	DEPTH (Feet) Minimum to Top of Pay	DEPTH (Feet) Maximum to Bottom of Pay	Average Thickness of Pay (ft.)	Type of Structure
Fars									
Gach Saran	38,400	33.0	Asmari	Lime	Olig-Miocene	4000	7000	1500	Anticline
Kermanshah									
Naft-i-Shah	3,840	42.8	Kalhur	Lime	Olig-Miocene	2600	2700	250	Anticline
Khuzistan									
Agha Jari	23,000	35.0	Asmari	Lime	Olig-Miocene	6000	9000	600	Anticline
Haft Kel	28,800	39.0	Asmari	Lime	Olig-Miocene	3000	4000	1000	Anticline
Lali	Not yet proved	35.2	Asmari	Lime	Olig-Miocene	5000	7000	1200	Anticline
Masjid-i-Sulaiman	34,500	38.0	Asmari	Lime	Olig-Miocene	2000	3000	1000	Anticline
Naft Safid (White Oil Springs)	6,400	36.0	Asmari	Lime	Olig-Miocene	5600	5700	1000	Anticline
Pazanun (Condensate)	6,400	Condensate	Asmari	Lime	Olig-Miocene	6000	8000	700	Anticline

IRAQ

ALL of Iraq's production is still coming from the Kirkuk field alone, which produced a total of 33,478,304 barrels during 1947, slightly under a million barrels more than it produced in 1946, and at the end of the year was producing at a rate of 91,402 barrels a day. While there are six other fields in Iraq capable of producing oil, all except the Kirkuk area are shut in for lack of sufficient pipe line outlet. Kirkuk production is coming from only 10 wells. Although there are 26 others wells in the field, the potential is such that it is possible to produce all the pipe line outlets can handle by operating only 10 wells at a time.

Pipe line construction was carried forward during the year through the laying of a new 16-inch line paralleling the south leg of the system terminating at Haifa. The construction has been completed to the Palestine border, but there is halted because of internal strife in that country. Scheduled to commence operation early in 1948, the line would provide an outlet for an additional 100,000 barrels daily from Iraq. However, during May the conflict between Arabs and Jews had reached such proportions that it was necessary to suspend operations completely and much of the company per-

Drilling in Iraq

Province and Field	WELLS COMPLETED IN 1947 Oil	Gas	Dry	Total Wells	Total Footage	Well Drilling and Shut Down at End of 1947 Drlg.	SD	Total
Diyala								
Naft Khaneh	...	...	...	...	...	...	...	...
Kirkuk								
Kirkuk	4	...	...	*8	19,142	...	1	1
Mosul								
Ain Zalah	...	...	...	...	825	2	...	2
Totals	4	...	...	8	19,967	2	1	3

* Including four observation wells.

Oil Production and Producing Wells in Iraq

PROVINCE AND FIELD	Operating Company	Year of Discovery	PRODUCING OIL WELLS END OF 1947 Shut in	Flowing	Art. Lift	Total Producing	CRUDE OIL PRODUCTION (Barrels) Daily at End of 1947	Year 1946	Year 1947	Cumulative Through 1947
Diyala										
Naft Khaneh	Khanaquin Pet. Co.	....	2	....	....	....	.....	.....	.....	.....
Kirkuk										
Kirkuk	Iraq Pet. Co	1927	26	10	....	10	91,402	32,777,430	33,478,304	359,178,304
Mosul										
Ain Zalah	Mosul Pet. Co.	1940	12	....	....	....	.....	.....	.....	.....
Jawan		1933	4	....	....	....	.....	.....	.....	.....
Najmah		1933	20	....	....	....	.....	.....	.....	.....
Qaiyarah		1927	39	1*	....	1*	.....	.....	.....	.....
Qasab		1935	5	....	....	....	.....	.....	.....	.....
	Totals	....	108	11	....	11	91,402	32,777,430	33,478,304	359,178,304

NOTE: All fields except Kirkuk shut in due to insufficient pipe line outlet. * Produced occasionally for local needs.

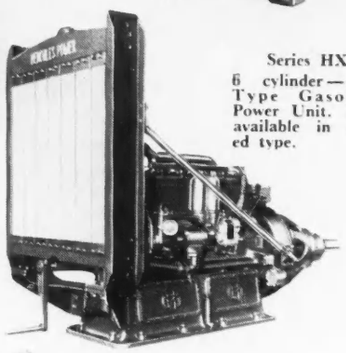
HERCULES ENGINES for OIL FIELD SERVICE

- ***Operating Economy***
- ***Dependable Performance***
- ***Ample Reserve Power***
- ***Long Life***
- ***Low Maintenance***

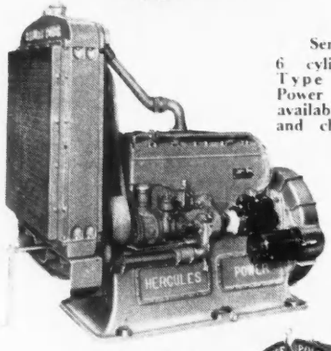
Hercules high speed, heavy duty ENGINES and POWER UNITS enjoy an enviable reputation for dependability in the oil field. The wide range of power available, plus the diversification of the Hercules line of Gasoline and Diesel engines (see chart below), has resulted in many prominent manufacturers and users of oil field machinery and related products to choose Hercules as a practical means of protecting their power interests.

Being the world's largest exclusive builder of high speed, heavy duty Gasoline and Diesel engines and power units, Hercules has the background of experience so essential in recommending the best stationary or mobile power plant for oil field service. Your inquiries are invited.

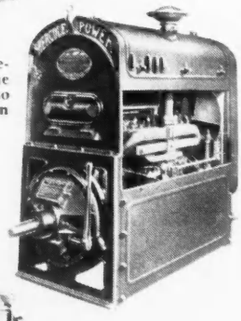
Series IX
4 cylinder—Closed Type Gasoline Power Unit. Also available in open and base types.



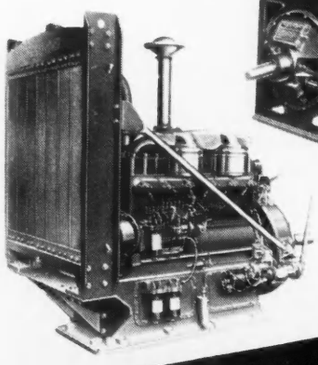
Series HX
6 cylinder—Base Type Gasoline Power Unit. Also available in closed type.



Series WX
6 cylinder—Base Type Gasoline Power Unit. Also available in open and closed types.



Series RX
6 cylinder—Closed Type Gasoline Power Unit. Also available in open and base types.



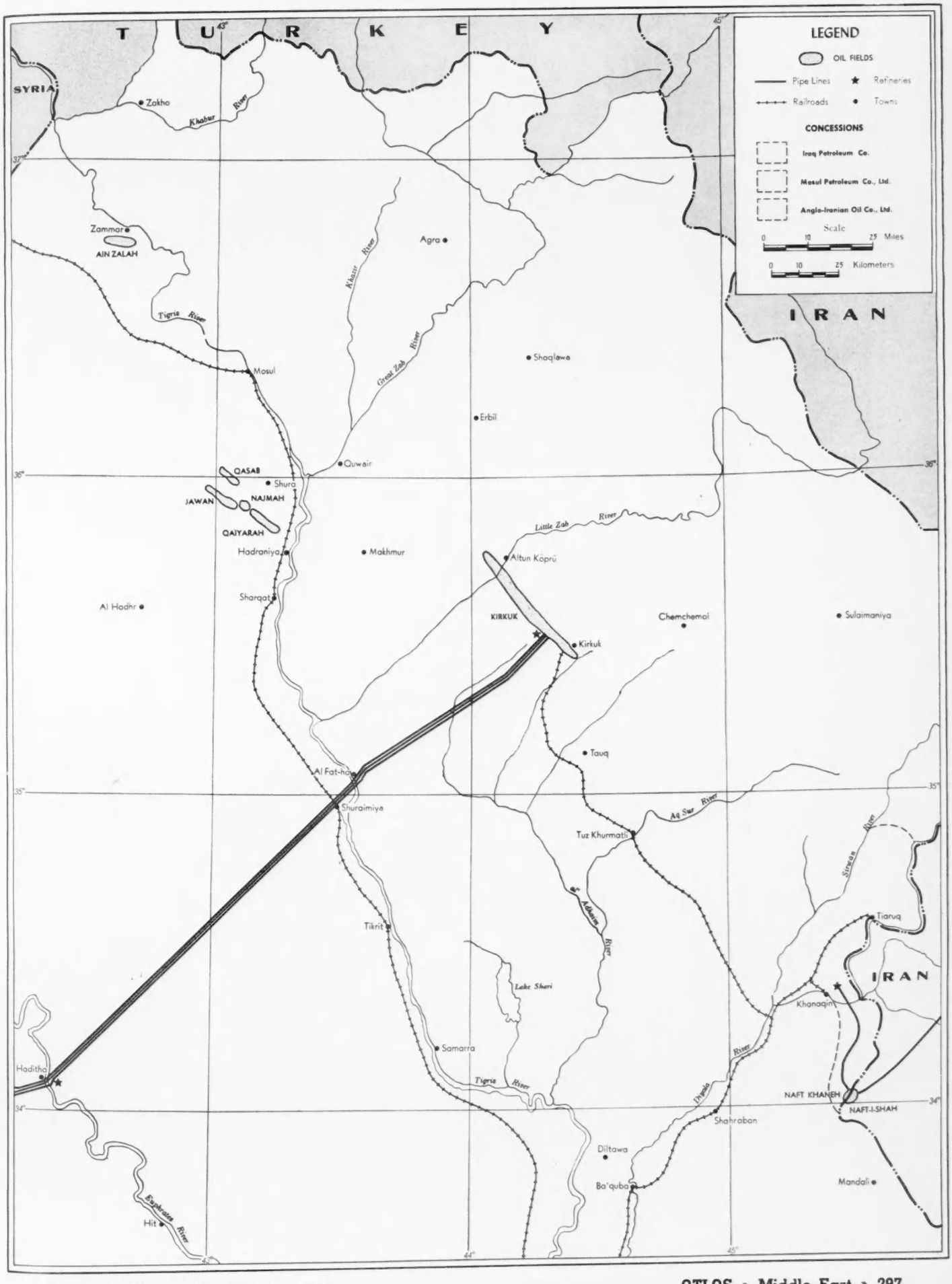
Series DFX
6 cylinder—Base Type Diesel Power Unit. Also available in closed type.

HERCULES ENGINES 3 TO 400 H.P.

DIESEL ENGINES			GASOLINE ENGINES		
Model	Bore and Stroke	Cu. In. Displ.	Model	Bore and Stroke	Cu. In. Displ.
Two Cylinder			**Two Cylinder**		
DIXC	4" x 4½"	113.1	BXB	2⅞" x 3"	39
DIXD	4¼" x 4½"	127.5	NXA	3" x 4"	56.5
Four Cylinder			NXB	3¼" x 4"	66.3
DIX4B	3¼" x 4"	133	**Four Cylinder**		
DIX4D	3⅝" x 4"	166	ZXA	2½" x 3"	59
DOOB	3⅜" x 4½"	198.8	ZXB	2⅝" x 3"	65
DOOC	4" x 4½"	226.2	IXA	3" x 4"	113
DOOD	4¼" x 4½"	255	IXB	3¼" x 4"	133
Six Cylinder			**Six Cylinder**		
DIX6D	3⅝" x 4"	249	QXA	3⅛" x 4⅛"	190
DJXB	3½" x 4½"	260	QXB	3¼" x 4⅛"	205
DJXC	3¾" x 4½"	296	QXC	3⅜" x 4⅛"	221
**DJXH	3¾" x 4½"	298	QXLD	3 7/16" x 4¼"	236.7
DWXC	4" x 4¾"	358	JXE	3½" x 4¼"	245
DWXD	4¼" x 4¾"	404	JXB	3⅝" x 4¼"	263
DRXB	4⅜" x 5¼"	474	JXC	3¾" x 4¼"	282
DRXC	4⅝" x 5¼"	529	JXD	4" x 4¼"	320
DFXB	5" x 6"	707	JXLD	4" x 4½"	339
DFXC	5¼" x 6"	779	WXC-3	4¼" x 4½"	383
DFXD	5½" x 6"	855	WXLC	4" x 4¾"	358
DFXE	5⅝" x 6"	895	WXLC-3	4¼" x 4¾"	404
**DFXH	5¾" x 6"	935	TDXB	4⅜" x 5¼"	474
Eight Cylinder			RXB	4½" x 5¼"	501
DNX V-8B	5¾" x 6"	1247	RXC	4⅝" x 5¼"	529
DNX V-8C	6" x 6"	1348	RXLC	4⅝" x 5¼"	529
DNX V-8D	6¼" x 6"	1468	RXLD	4¾" x 5¼"	558
** Special high output performance.			**RXLDH	4¾" x 5¼"	558
			HXB	5" x 6"	707
			HXC	5¼" x 6"	779
			HXD	5½" x 6"	855
			HXE	5¾" x 6"	935
			*HXE	5¾" x 6"	935
			* Dual carburetion.		

HERCULES MOTORS CORPORATION
CANTON, OHIO, U. S. A.

IRAQ—Producing Area



LINK-BELT PRODUCTS *Geared to* OIL INDUSTRY NEEDS

● Link-Belt oil industry products are backed by the vast resources that come from over 70 years of industrial progress. Unfailing performance proves this wherever men drill for and produce oil. Whether in use in original equipment manufacture or as replacement parts in field service, products that bear the Link-Belt trademark have earned and won the acceptance of operators since the oil industry's pioneer days. Examples of Link-Belt's oil industry line are shown here. The complete line is shown and described in your Composite Catalog.

LINK-BELT COMPANY

Engineers - Manufacturers - Exporters - Established 1875
Houston 2, Dallas 1, Los Angeles 33, Indianapolis 6, Philadelphia 40, Kansas City 6, Mo., Toronto 8.

EXPORT SALES OFFICES:

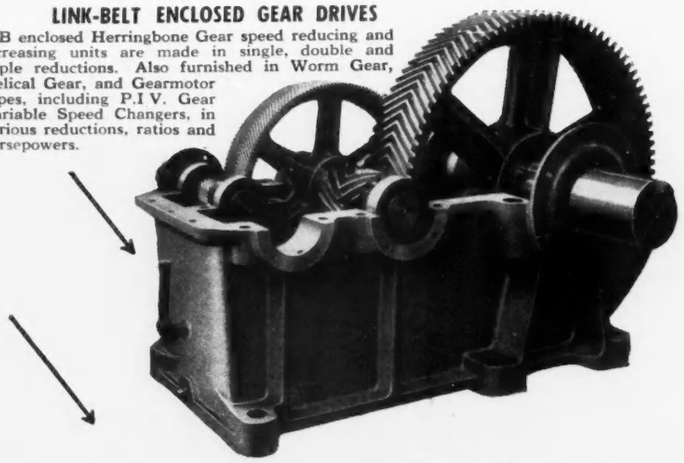
2680 Woolworth Bldg., 233 Broadway, New York 7, N. Y.

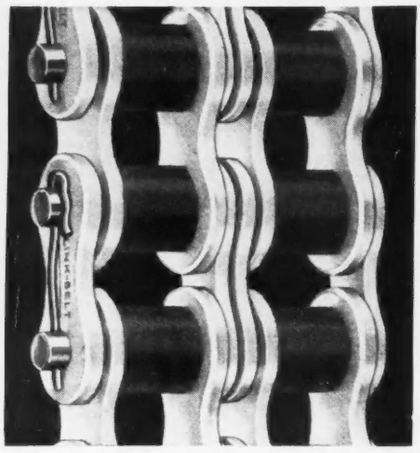
Offices, Factory Branch Stores, and Distributors in Principal Cities and Representatives throughout the World.
Cable and Radio Address: LINKBELT—NEW YORK.

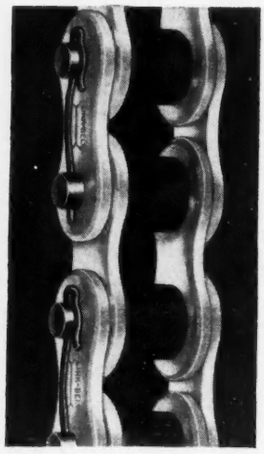
10,530-E

LINK-BELT ENCLOSED GEAR DRIVES

L-B enclosed Herringbone Gear speed reducing and increasing units are made in single, double and triple reductions. Also furnished in Worm Gear, Helical Gear, and Gearmotor types, including P.I.V. Gear Variable Speed Changers, in various reductions, ratios and horsepowers.

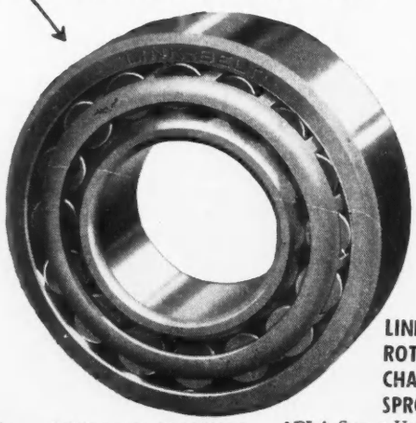






LINK-BELT SILVERLINK OIL FIELD ROLLER CHAINS AND SPROCKETS

Made in all required sizes and widths, including sprockets. Alloy steel construction, great strength, light weight and ability to withstand shock has made it the top chain choice of operators and manufacturers alike.

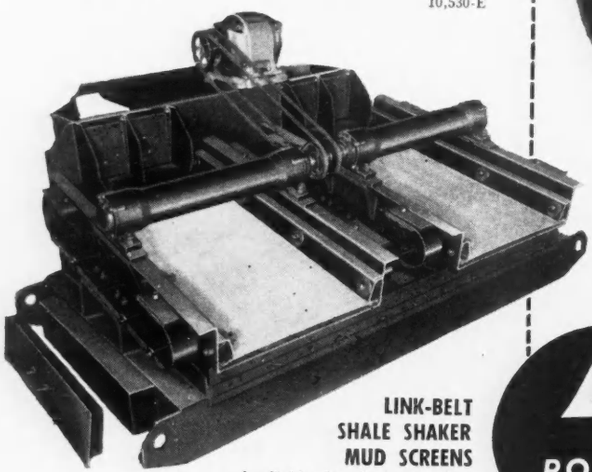


LINK-BELT BEARINGS

Available in a wide range of sizes, ball and roller types, unmounted or mounted as pillow blocks, cartridge and flange units or other mountings.

LINK-BELT ROTARY CHAINS & SPROCKETS

API-4 Super Hyper Precision rotary chain, an exclusive Link-Belt design, is one of several L-B types of heavy duty (SS) rotary chains and sprockets. It's stronger, longer lasting.



LINK-BELT SHALE SHAKER MUD SCREENS

Available in single or dual units . . . made in three types: NRM-124—24"x48", NRM-145—48"x60" and NRM-134—36"x48". Specify dependable L-B Shale Shakers. They'll keep you out of mud trouble.

LINK-BELT

THE SYMBOL OF QUALITY — LINK-BELT

POWER TRANSMISSION MACHINERY
ROTARY MUD SCREENS

IRAQ—Continued

sonnel was moved to Tripoli, the terminus of the northern leg of the pipe line system.

Drilling continued in the Kirkuk field, resulting in completion of 8 new wells, six of which were intended for production for the new pipe line, and two for observation wells.

The Iraq Petroleum Company group of subsidiary companies were quite active in exploratory work during the year, carrying on geophysical work and preparing to drill a series of exploratory wells. The Basrah Petroleum Company plans two wildcats near the city of Basrah on a 90,000-square mile concession. Mosul Petroleum Company, whose 40,000-square mile concession includes the Ain Zalah field, has started two rigs working in the field, deepening an old well to the Cretaceous, and starting on a new well. Iraq Petroleum Company itself holds concessions on some 30,000 square miles.

Future plans for pipe line outlets from Iraq have included possible construction of still another new line to terminate at Tripoli and give the I.P.C. group a total outlet for 270,000 to 300,000 barrels upon completion of all work.

Pipe Lines of Iraq

COMPANY	Origin	Terminus	Length (Miles)	Diameter (Inches)	Year Completed	Status (In Use, Idle, Bldg., Plan's)
Crude Oil Lines:						
Iraq Pet. Co.	Kirkuk	Haifa	621	12¾	1934	Operating
	Kirkuk	Haifa	620	16		Building
	Kirkuk	Tripoli	530	12¾	1934	Operating
	Kirkuk	Tripoli	530	16		Planned

Refineries of Iraq

COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Daily Crude Runs End of 1947 (Bbls.)	Type of Refinery	Operating Status
Iraq Government	Baiji	....	....	....	.....	Planned
Iraq Petroleum Co.	K-3 Station (Baba Gurgur)	1500	None	....	Skimming	Operating
Iraq Petroleum Co.	Kirkuk	1500	None	....	Skimming	Operating
Khanaquin Pet. Co.	Alwand	6900	None	....	Skimming	Operating
	Totals	9900	None			

Engineering and Geological Data on Iraq Fields

Province and Field	Proved Area (Acres)	Range of Gravity Oil (API)	Name	Kind	Age	DEPTH (Feet) Minimum to Top of Pay	DEPTH (Feet) Maximum to Bottom of Pay	Average Thickness of Pay (ft.)	Type of Structure
Diyala									
Naft Khaneh	....	42.8	Asmari	Limestone	Mio-Eoc.	3000	....	200–300	Anticline
Kirkuk									
Kirkuk	83,500	36	Quarah Chauq	Limestone	Eoc.-Mio.	950	3200	800	Closed Anticline
Mosul									
Ain Zalah	3,600	32	Ain Za'ah	Limestone	Cret. or Mio.	5000	6000	200	Closed Anticline
Jawan	8,500	20	Main Limestone	Limestone	Miocene	700	1000	600	Anticline
Najmah	2,000	20	Main Limestone	Limestone	Miocene	700	1000	600	Anticline
			Pilsner	Limestone	Upper Cret.	1500	1800	300	Anticline
Qaiyarah	12,000	20	Shallow Zone	Limestone	Miocene	....	....	....	Anticline
			Main Limestone	Limestone	Miocene	700	1000	600	
Qasab	3,900	20	Main Limestone	Limestone	Miocene	700	1000	600	Anticline
			Pilsner	Limestone	Upper Cret.	1500	1800	300	

KUWAIT

KUWAIT Oil Company, Limited, owned jointly by Anglo-Iranian Oil Company and Gulf Exploration Company, holds a concession on all of the Independent Shiekhdom of Kuwait. The Burghan field, although it covers a presently proved area of only 6500 acres, is considered by leading engineers as perhaps the greatest single concentrations of oil reserve now known. These estimates are based on completion of only 13 oil wells, five of which were drilled during 1947.

The field had been closed in with wells cemented as a security measure during World War II, but rehabilitation has been rapid since operations were resumed, and although the field had been on production only a year and a half up to the end of 1947, it had produced a total of 22,253,900 barrels of crude, 16,227,093 barrels of which were produced during 1947. An agreement with the Shell Group during the early part of 1947 has helped in establishing a market, and output now is limited more by lack of tankers than by ability of the field to produce. At the close of the year it was producing an average of 62,000 barrels a day.

Wells are completed to depths of 4750 feet, and 10 of the 13 wells are dual-zone producers. Production comes from three principal sand zones of Middle Cretaceous age with depth range from 3672 feet on down. No information has been given in detail as to total thickness of producing pay, but about 350 feet of section is taken in normally when perforating for completion. Drilling pattern is on a triangular grid with about 600 acres drainage area per well.

During most of 1947 five drilling rigs were being operated. Two others were added late in the year, and it was planned to increase to 12 rigs running regularly by later in 1948.

Oil is brought in to a central storage location on a ridge five miles back from the shore of the Persian Gulf, loading by gravity from that point to a tanker berthing point 4500 feet offshore through two 16-inch loading lines.

Kuwait will have access to some of the space in the Middle East Pipe Line from Abadan upon construction of the line.

Salient Data on Burghan Field

Operating Company	Kuwait Oil Co., Ltd. (Gulf and Anglo-Iranian)
Year of Discovery	1938
Producing Wells—Oil, Flowing	13
Pumping	None
Daily Production, end of 1947	62,000 bbls.
Production in 1946	5,989,762 bbls.
Production in 1947	16,227,093 bbls.
Cumulative to End of 1947	22,253,900 bbls.
Wells Drilled in 1947—Oil	5
Gas	None
Dry	None
Total Wells	5
Footage Drilled	23,818
Field Wells Drilling—End of 1947	5
Estimated Proven Area of Field	6,500 Acres
Gravity of Oil (A.P.I.)	32.5
Producing Formation:	
Local Name	.....
Kind	Sand
Age	Cretaceous
Minimum Depth to Top of Pay	3672 Feet
Minimum Depth to Bottom of Pay	4750 Feet
Average Thickness of Pay	350 Feet
Type Structure	Anticline
Concession Area	3,839,996 Acres (All of Kuwait)

Accurate Seismic Exploration

Areas previously thought to be inaccessible for *seismic* operations . . . swamp, marsh and rugged mountainous areas, along with coastal waters . . . are now being economically and accurately surveyed by skilled Marine Exploration crews.

Marine crews are able to negotiate the difficult terrain due to the specially designed portable seismic equipment . . . employed by Marine Exploration and used *first* by Marine Exploration crews.

The compact portable mechanized drilling, shooting and surveying equipment has been designed by Marine for operation with the specialized electronic seismic instruments.

Marine Exploration crews have standardized on portable seismic equipment adaptable to land and water operations in any area.

Now, Marine crews have added helicopters as another means of quickly . . . and accurately . . . surveying difficult areas. With a maximum payload of only 400 lbs. any *complete Marine* unit may be transported and *operated* intact. In addition, Marine Exploration is equipped to compile data with conventional land seismic equipment.

Let Marine demonstrate the *economy* of using the *right* equipment in the *right* manner in your costly prospects.

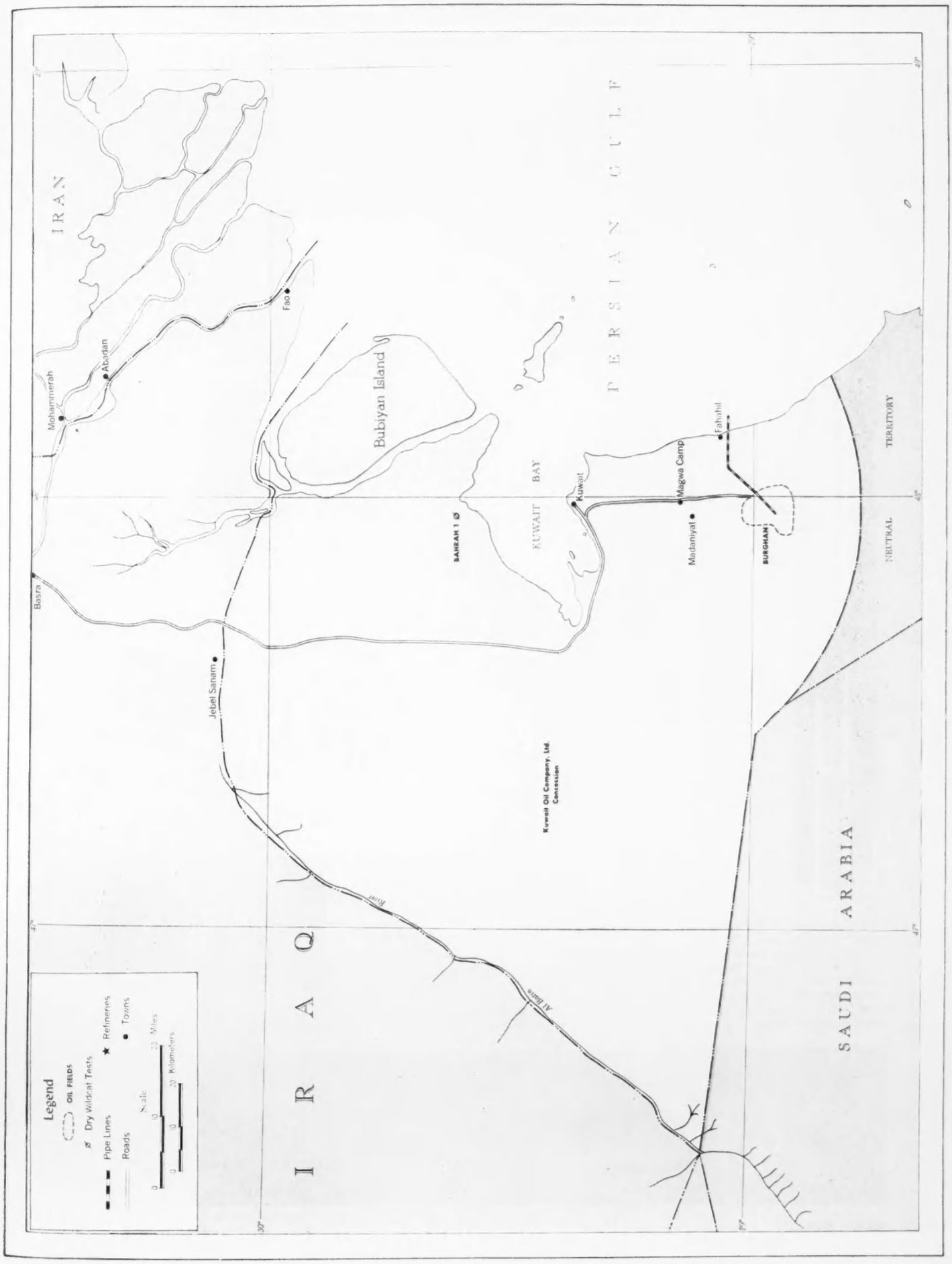
Write us for complete information on how Marine Exploration can deliver to you accurate seismic surveys of any area you name. Crews are available for foreign and domestic work.

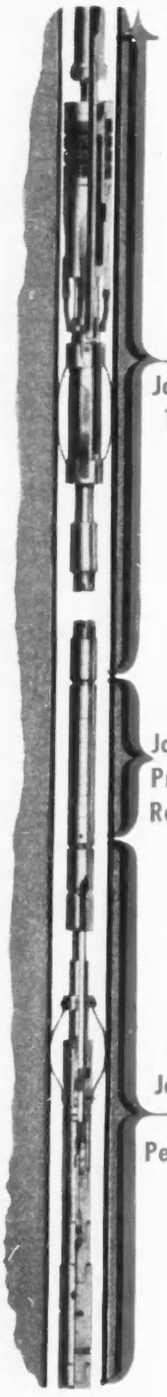
MARINE
EXPLORATION CO.

3722 Westheimer Road — Justin 8-1521

Houston 6, Texas

KUWAIT


IRAN
PERSIAN GULF
Fao
Abadan
Mohammerah
Bubiyan Island
Basra
Jebel Sanam
BAHRAIN
KUWAIT BAY
Kuwait
Magwa Camp
Fahahil
Madaniyat
BURGHAN
NEUTRAL TERRITORY
Kuwait Oil Company, Ltd. Concession
IRAQ
SAUDI ARABIA
Legend
OIL FIELDS
Dry Wildcat Tests
Pipe Lines
Refineries
Roads
Towns
Scale
Miles
Kilometers



The Johnston "SHOOT-N-TEST" Gun Perforator connected to a regular Johnston Pressure Recorder and Formation Tester permits both casing perforation and formation test in a single trip of tubing or drill string.

MEMO TO:

Johnston Formation Tester

OWNERS and OPERATORS

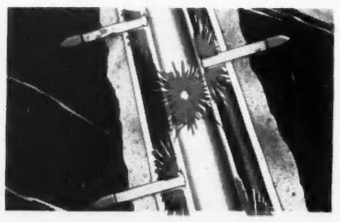
By unitizing a Johnston "SHOOT-N-TEST" Gun Perforator with your regular Johnston Formation Tester Assembly, any designated formation can be both perforated and tested in one round trip of tubing or drill pipe. The "SHOOT-N-TEST" Gun Perforator is easily connected to Johnston test equipment for combined Perforation and Test operations. Simple top-hole manipulation of the string by the driller prepares the Gun Perforator for firing -- existing hydrostatic pressure in the well trips the firing mechanism.

The Johnston "SHOOT-N-TEST" Gun Perforator has the versatility to be used solely as a casing perforator or as the perforating unit in combined perforation and test operations. Its design embodies many advanced features to make it the ideal choice for operators desiring the utmost safety and efficiency in perforation equipment.

THE JOHNSTON SHOOT-N-TEST GUN PERFORATOR

"SHOOT-N-TEST" with the JOHNSTON All-Purpose GUN PERFORATOR Offers These Features

- SAFER GUN OPERATION
- POSITIVE FIRE OF ALL BULLETS
- ANY NUMBER OF PERFORATIONS
- EXACT POSITIONING in test zone
- MINIMUM NUMBER OF EXPENDABLE PARTS
- FAST, EASY MAINTENANCE



Fully patented—covered by Patent Nos. 2,073,107, 2,189,919, 2,126,641, 2,129,216, 1,901,813, 2,161,233, 2,176,766, 2,218,988, 2,186,488, 2,307,360, 2,305,139, 2,295,634

SHOOT-N-TEST Trademark FORMATION AND CASING TESTING

M. O. JOHNSTON OIL FIELD SERVICE COMPANY

EXPORT SALES

3035 ANDRITA STREET, LOS ANGELES 41, CALIFORNIA, U. S. A. • CABLE ADDRESS "MOJOC"

CYPRUS

PETROLEUM Development (Cyprus) Ltd., an I.P.C. subsidiary holds an exploration permit on a substantial part of the island, During 1947 geological and geophysical work was carried on, but no steps have been taken toward converting the permits into exploitation licenses.

LEBANON

THE Lebanon Petroleum Company, another I.P.C. subsidiary, holds an exploration permit on a small area around the town of Tripoli. During 1947 geological work was completed enabling the company to select a drilling site for Terbol 1, on a large structure. The well had reached a depth below 4300 feet by the end of the year.

PALESTINE

PETROLEUM Development (Palestine) Ltd., one of the I.P.C. group, has started operations on its holdings in Palestine, and at the close of the year had drilled to a depth below 2300 feet in its Huleiqat 1 wildcat near the town of Gaza. Location was being prepared for a wildcat on the Kurnub structure in the Negeb to the southeast. Jordan Exploration Company, Ltd., holds a small area near the Dead Sea.

QATAR

AFTER having been inactive since before the war, Petroleum Development (Qatar) Ltd., resumed development in the Dukhan field during 1947. One rig is operating, drilling Dukhan 4, on the north end of the structure at a depth just below 5000 feet at the close of the year, and nearing the Kerkret Limestone which is the equivalent to the Arab zone in Saudi Arabia. The company, a subsidiary of Iraq Petroleum Company, had drilled two producers and a dry hole since discovery in 1940, but the oil wells were plugged during the war as a security measure. Geophysical work is being carried out on the concession which covers all of Qatar, approximately 4000 square miles.

DUKHAN FIELD

Operating Company: Petroleum Development Company. **Discovered:** 1940. **Producing Wells:** 2 shut-in oil wells. **Drilling at end of 1947:** One. **Footage Drilled:** 5000. **Gravity of oil:** 36. **Producing Formentation:** Kerkrit Lime, Jurassic or Cretaceous. Minimum depth to top of pay 5600 feet, maximum to bottom 6015 feet, average thickness 200 feet. **Structure:** Anticline.

SAUDI ARABIA—BAHREIN

SAUDI ARABIA has been the most active of any of the Middle East countries from the standpoint of development and construction. Facilities for shipping and transporting oil have been enlarged and coordinated so that great increases have been possible in production, which amounted to 89,340,662 barrels during 1947, nearly half again as much as was produced in 1946. At the same time plans were pushed for the construction of the proposed 1040-mile pipe line to connect the fields on the Persian Gulf with a port at Sidon on the Mediterranean Sea. Political developments during late 1947 and early 1948 have left the schedule of construction depending largely on the outcome of Arab-Jewish conflicts, but in the meantime work is being concentrated on segments of the line which can connect producing fields with seaports on the Persian Gulf and can still become an integral part of the entire project when it is given the green light. Construction on the great 30-31 inch line is now going ahead to connect Abqaiq and Qatif Junction and extending on up to Abu Hadriya which has been shut in since discovery for lack of an outlet.

Other pipe line construction has resulted in completion of a new 14-inch line from Abqaiq to Dharan, with a capacity of 110,000 barrels a day and work was started on still another line from Abqaiq to Ras Tanura via Buqqa, which will have capacity of 300,000 barrels daily. Elimination of certain bottlenecks and changing certain practices has increased the regular capacity of the refinery at Ras Tanura to 115,000 barrels a calendar day.

Oil Production and Producing Wells in Saudi Arabia and Bahrein

State and Field	Operating Company	Year of Discovery	PRODUCING OIL WELLS END OF 1947				CRUDE OIL PRODUCTION (Barrels)			
			Shut In	Flowing	Art. Lift	Total Producing	Daily at End of 1947	Year 1946	Year 1947	Cumulative Through 1947
SAUDI ARABIA										
Abqaiq	Arabian American Oil Co.	1940	10*	17		17	200,000	24,783,738	53,659,715	78,460,908
Abu Hadriya		1940	1	....		....	.....	.....	.....	.....
Buqqa		1947	3	....		....	.....	.....	.....	.....
Dammam		1936	....	34†		34	100,000	34,585,118	34,816,451	121,624,034
Qatif		1945	....	2		2	5,000	971,806	1,375,479	2,516,445
Total			14	53		53	305,000	60,340,662	89,851,645	202,601,387
BAHREIN										
Bahrein	Bahrein Petroleum Co.	1932		64		64	28,000	8,009,802	9,410,710	87,999,166

* Represents oil wells completed during 1947, but not yet connected to gathering system. † One gas well included.

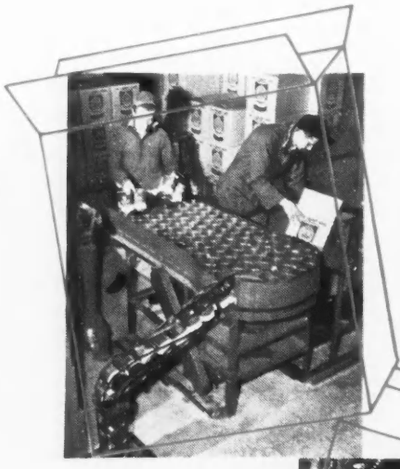
Engineering and Geological Data on Saudi Arabia and Bahrein Fields

State and Field	Proved Area (Acres)	Range of Gravity Oil (API)	Name	Kind	Age	Depth (Feet)		Average Thickness of Pay (Ft.)	Type of Structure
						Minimum to Top of Pay	Maximum to Bottom of Pay		
SAUDI ARABIA									
Abqaiq	50,000	19-38	Arab	Lime	Jurassic	5,600	7,400	210	Anticline
Abu Hadriya	Unknown	....	Hadriya	Lime	Jurassic	10,000	10,220	110	Anticline
Buqqa	Unknown	....	Arab	Lime	Jurassic	7,000	7,225	220	Anticline
Dammam	9,000	34-68	Bahrein	Lime	Cretaceous	1,600	2,300	....	Faulted
			Arab	Lime	Jurassic	4,400	4,900	325	Anticline
Qatif	Unknown	29-38	Arab	Lime	Jurassic	7,100	7,500	187	Anticline
BAHREIN									
Bahrein	10,000	33.5	Arab	Lime	Jurassic	2,000	2,250	....	Elongated Dome
						4,000	4,600		

General American's *new* canning equipment turns out 7 cases a minute

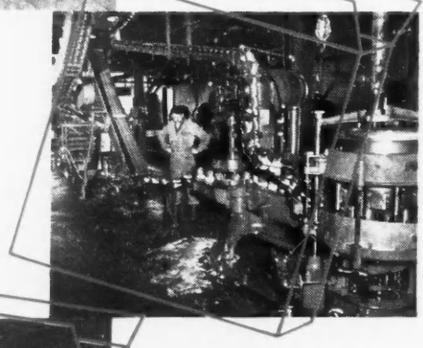
Public tank storage terminals install modern high speed equipment for use by customers

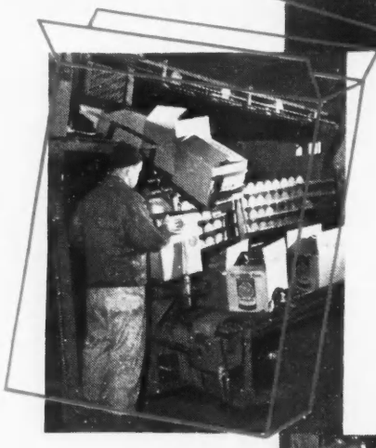
At both Carteret, N. J., and Good Hope, La., in addition to filling drums, General American has installed complete canning facilities for filling and packing one-quart cans of petroleum. Now, users of these public tank storage facilities may take advantage of this new service for speedy and efficient canning of their own petroleum, blended according to their specifications, — with no investment in equipment or need for transshipping the bulk petroleum.



Empty cans and cases are fed into gravity chutes of General American's canning equipment.

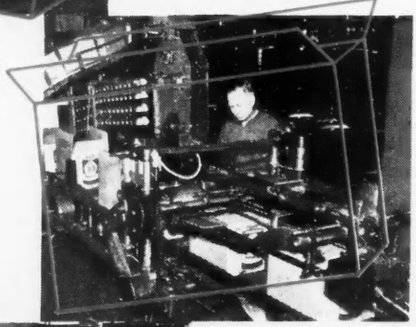
Automatic machines fill the cans, conveyers carry them to automatic closing machines.

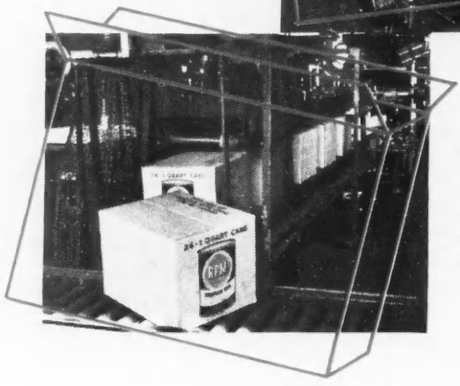




Even the casing machine is automatic! Filled cans are arranged properly and set into the cartons simultaneously.

Cases are glued mechanically. Each one is sealed by machine in order to withstand jar and shock of shipping.





The completed cases are stenciled and carried away to loading docks, ready for delivery by truck, train or ship.

TANK STORAGE TERMINALS GENERAL AMERICAN TRADE MARK

GENERAL AMERICAN TANK STORAGE TERMINALS

A Division of

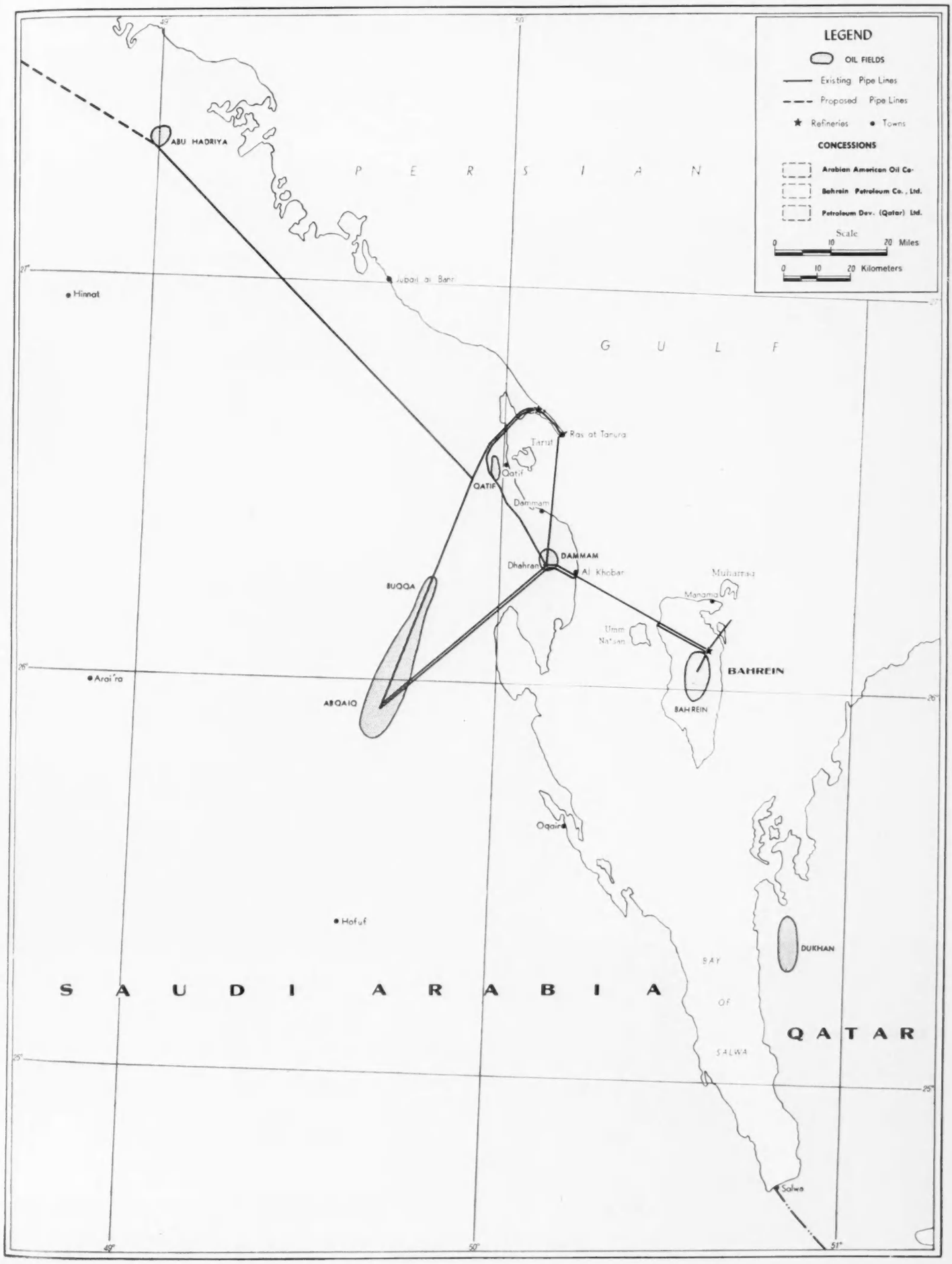
GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South LaSalle Street, Chicago

BRANCH OFFICES

Buffalo • Cleveland • Dallas • Houston • Los Angeles • New Orleans
New York • Pittsburgh • St. Louis • San Francisco • Seattle • Tulsa
Washington

SAUDI ARABIA, BAHREIN and QATAR—Producing Area



LOCK-SCREW TYPE

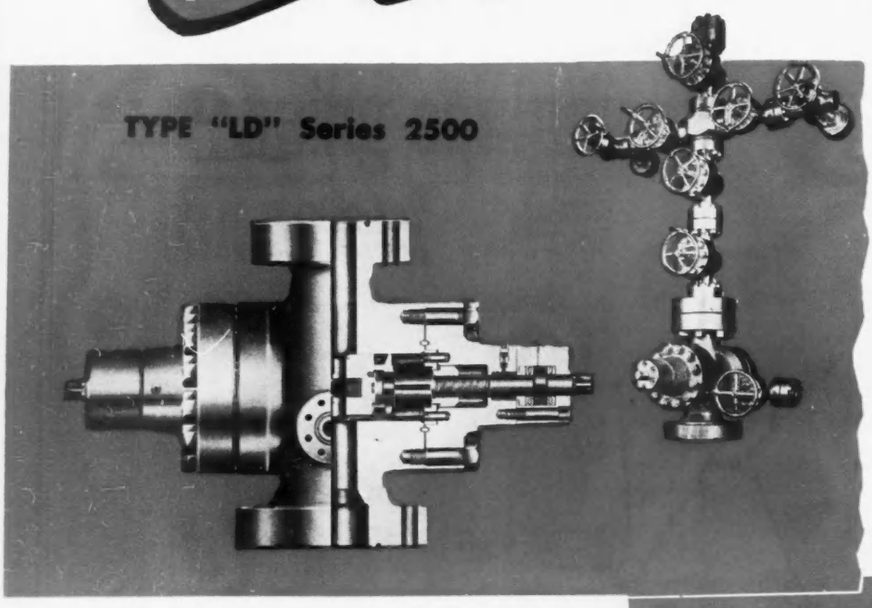
RAM TYPE

Cameron

OFFERS BOTH STYLES OF TUBING HEADS with *Eight* types of TUBING SUSPENSION

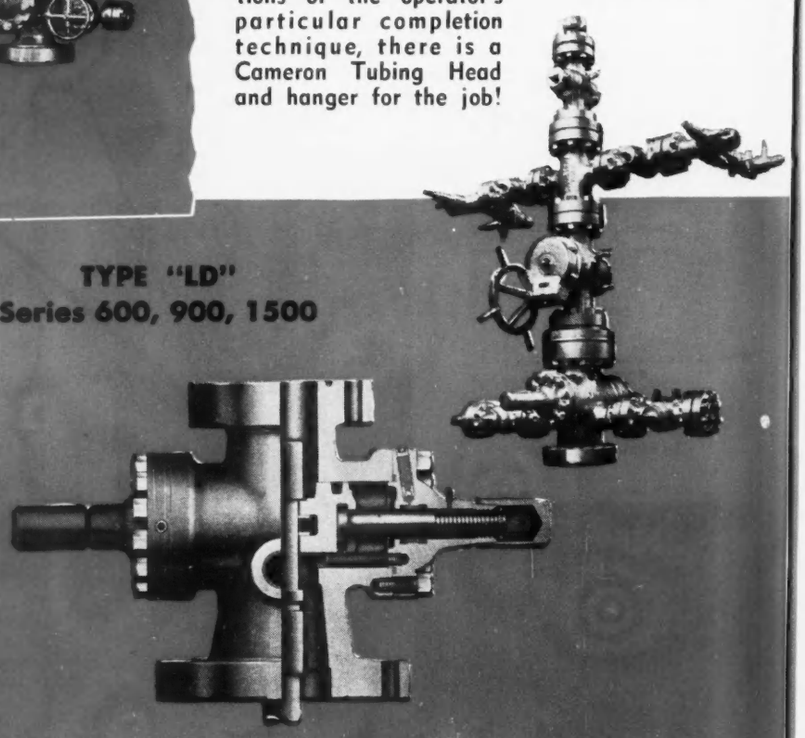
To the Cameron line of Ram Type Tubing Heads, which for many years has been one, if not the most popular tubing heads in the field, has been added the popular lock screw type head with several proven interchangeable hangers. Now, regardless of subsurface conditions or the operator's particular completion technique, there is a Cameron Tubing Head and hanger for the job!

TYPE "LD" Series 2500



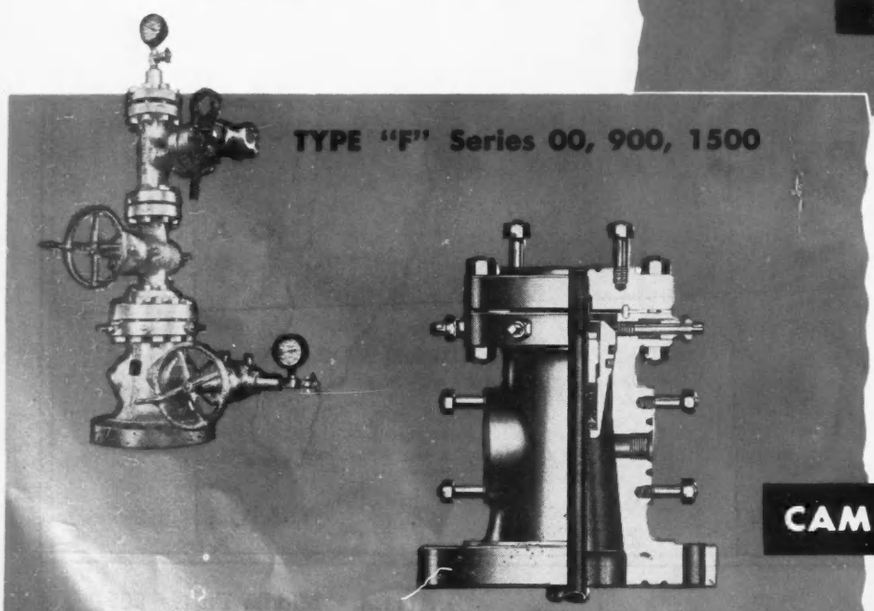
Above — This is the Cameron Ram-Type Tubing Head that has distinguished itself on most of the industry's record-breaking deep, high-pressure wells. In most instances, tubing is suspended from a hanger flange installed above the head, and its rams are utilized to seal the annulus. (Other uses for the rams are outlined below.)

TYPE "LD" Series 600, 900, 1500



Right—This is the Cameron Ram-Type Tubing Head that is probably used by more production men than any other make. Its rams suspend and seal the tubing string, utilizing a hanger nipple as shown (tubing may also be suspended from hanger flange above the head). This head provides an extra blowout preventer during completion operations and greatly facilitates reworking subsequent to original completion.

TYPE "F" Series 00, 900, 1500



Left—This is the new Cameron Type "F" Forged Steel Tubing Head which employs the popular lock screw design. Its flanged housing is an integral alloy forging from the big Cameron 5000-ton press. Several types of tubing hangers are interchangeable in this head, permitting the selection of the suspension and seal most suitable for the completion requirements. The popular Type "FS" "polished joint" Hanger is illustrated.

CAMERON IRON WORKS, INC.

P. O. BOX 1212, HOUSTON, TEXAS

SAUDI ARABIA—BAHREIN—Continued

Drilling activity was concentrated largely in the Abqaiq field, step-out drilling having enlarged the limits and productivity of the field, and edge water was finally found in well No. 19 on the east flank, the well now serving as an observation well. The activation of additional drilling rigs has made possible the completion of 24 wells, compared with only 11 new wells drilled in 1946, 18 of the wells being in the Abqaiq field and the remainder at Buqqa, Qatif and Dammam. Development of the field has proceeded so rapidly that many of the new wells are not yet connected into the gathering system, since wells already connected have kept pace with the capacity of the transportation systems. The Buqqa area was opened early in the year, several miles north of Abqaiq field, but subsequent drilling has shown that it is merely a northeasterly extension of Abqaiq, adding materially to the already substantial reserve of that area.

At the close of the year Saudi Arabia was producing at a rate of 305,000 barrels daily, and it is understood that some increase has been made possible since that time by new transportation units.

During the year Arabian American Oil Company, jointly-owned subsidiary of The Texas Company and Standard Oil Company of California, surrendered all of its preferential rights to territory west of the 46th Meridian. This does not affect the 440,000 acres held under concession for active exploitation.

Bahrein Island, after a lapse of several years in drilling activity, has maintained a drilling rig in the field through most of the year, completing six new wells and showing immediate result in upping production to 28,000 barrels daily from the 1946 rate of 25,000 barrels a day. It is hoped to increase this to 30,000 barrels daily by early 1948. Meanwhile exploratory work is being done on shoals and islands offshore.

Alterations to existing units of the Bahrein refinery have allowed steady increases in capacity which, with present demand for diesel and fuel oils has brought capacity at the close of the year to 153,500 barrels per stream day. At the end of the year facilities for manufacturing 50,000 tons of asphalt per year had been constructed and were being placed in operation.

Refineries in Saudi Arabia and Bahrein

Company	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Daily Crude Runs End of 1947 (Bbls.)	Type of Refinery	Operating Status
SAUDI ARABIA						
Arabian American Oil Co.	Ras Tanura	115,000	None	115,000	*Skimming	Operating
BAHREIN						
Bahrein Petroleum Co.	Bahrein Island	153,500	Thermal cracking 14,900, Thermal reforming 13,000	153,500	S-C-A	Enlarging
QATAR						
No Refineries in Qatar						

* Complete distillation and reforming but without cracking, lube, wax or asphalt plants.

Crude Oil Pipe Lines of Saudi Arabia

Company	Origin	Terminus	Length (Miles)	Diameter (Inches)	Capacity	Year Completed	Status
Arabian American Oil Co.	Abqaiq	Dhahran	40	14	110,000	1947	Operating
	Abqaiq	Dhahran	40	12 & 14	100,000	1946	Operating
	Abqaiq	Ras Tamura via Buqqa	65	30–22–20	300,000	....	Building
	Dhahran	Ras Tanura	23	12	123,000	1946	Operating
	Dhahran	Ras Tanura	39	10	65,000	1939	Operating
	Dhahran	Bahrein	34	12	110,000	1945	Operating
Trans-Arabian Pipe Line Co.	Abqaiq	Sidon, Lebanon	1100	30 & 31	330,000	....	Building

REFINED PRODUCT LINES Ras Tanura Terminal to loading wharf.

Drilling in Saudi Arabia and Bahrein

State and Fields	WELLS COMPLETED IN 1946					WELLS COMPLETED IN 1947					WELLS DRILLING AND SHUT DOWN T END OF 1947		
				Total					Total				
	Oil	Gas	Dry	Wells	Footage	Oil	Gas	Dry	Wells	Footage	Drlg.	SD	Total
SAUDI ARABIA													
Abqaiq	5	....	....	5	33,730	17	....	1	18	104,228*	5	....	5
Abu Hadriya	....	....	....	....	.....	.....	.....	.....	.....	.....	....	1	1
Buqqa	....	....	....	....	.....	3	....	....	3	22,895*	....	....	....
Dammam	6	....	....	6	28,905	1	....	....	1	3,270*	....	....	....
Qatif	....	....	....	....	.....	1	....	1	2	12,831*	1	....	1
Total	11	....	....	11	62,635	22	....	2	24	143,224	6	1	7
BAHREIN													
Bahrein	....	....	....	....	.....	6	....	....	6	13,660	1	....	1

* Represents footage drilled during 1947.

SYRIA

SYRIA Petroleum Company, Iraq Petroleum Company subsidiary, carried out important exploration work during the past year, and spudded two wildcats. One test was located at Baflioun, north of Aleppo, and another at Dolaa in the Palmyra Basin. The former was drilling below 4700 feet, and the latter below 1700 feet at the close of the year. The company holds a concession of 37,000 square miles, covering all of Syria except a small area in the southern part.

TRANSJORDAN

A CONCESSION covering all of Transjordan was granted during 1947 to the Transjordan Petroleum Company, another subsidiary of Iraq Petroleum Company. The concession covers an area of 28,000 square miles, and geological and geophysical work has already started.

TURKEY

TURKEY became a commercial producer of oil just before the beginning of 1947 with completion of Raman 9, in the Ramandag area, swabbing at the rate of 500 barrels a day from 4400 feet. A stepped-up drilling program has been instituted with four rigs now in Turkey, together with one geophysical crew. Turkey's Maden Tetkik ve Arama Enstitutu has charge of all oil activity, and actual drilling is contracted to Drilling and Exploration Company. Geophysical work is by United Geophysical Company. The series of wells at Ramandag started in 1940 when the first well flowed 70 barrels daily for a short while. Two others have produced small quantities of heavy oil.

Grease Manufacture *Simplified*

TIME SAVED.. COST REDUCED

WITH

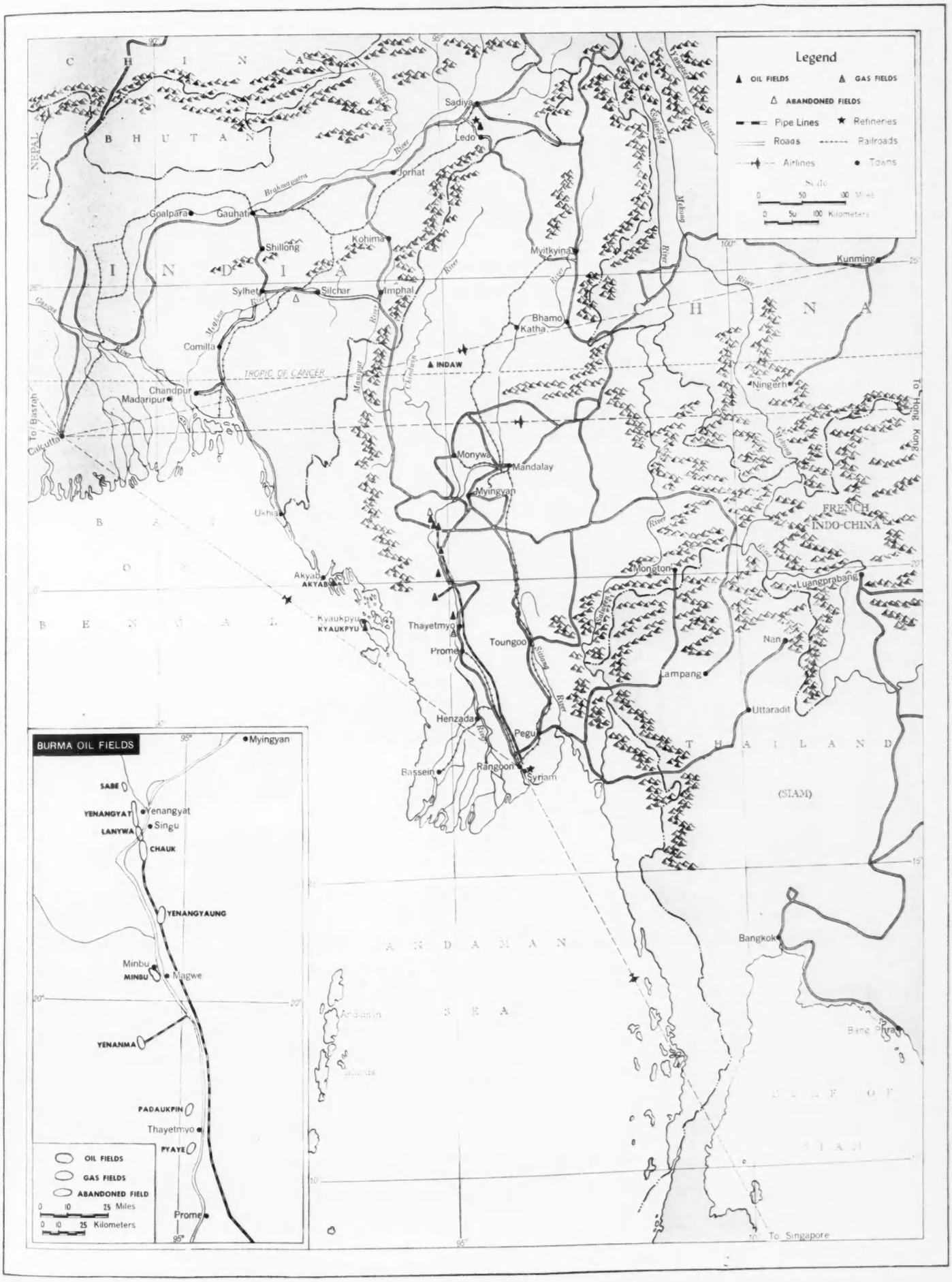
STRATCO

PRESSURE SOAP CONTACTORS
AND
OIL CIRCULATION
HEATING SYSTEMS

The Stratco Alkylation Contactor, standard oil refinery equipment for many years, now has been adapted to grease manufacture – to provide extremely short manufacturing time cycles, reduced fat consumption, a more uniform product.

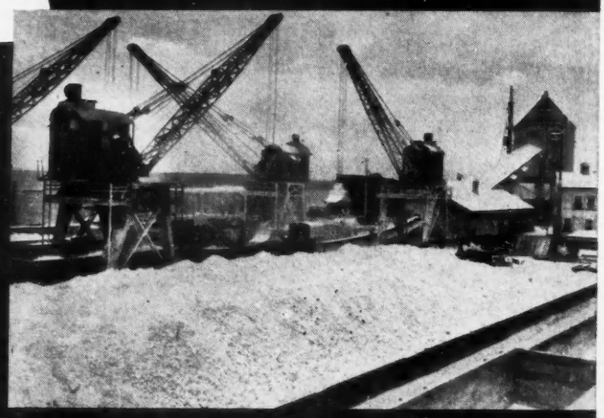
STRATFORD ENGINEERING
CORPORATION
PETROLEUM REFINING ENGINEERS
DIERKS BLDG. KANSAS CITY, MO.

BURMA


Legend
OIL FIELDS
GAS FIELDS
ABANDONED FIELDS
Pipe Lines
Refineries
Roads
Railroads
Airlines
Towns
Scale
0 50 100 Miles
0 50 100 Kilometers
CHINA
BHUTAN
INDIA
NEPAL
BAY OF BENGAL
ANDAMAN SEA
GULF OF SIAM
FRENCH INDO-CHINA
THAILAND
(SIAM)
Sadiya
Ledo
Jorhat
Goalpara
Gauhati
Shillong
Kohima
Myitkyina
Kunming
Sylhet
Silchar
Imphal
Bhamo
Katha
Comilla
INDAW
TROPIC OF CANCER
Chandpur
Madaripur
Calcutta
To Basrah
Ningerh
To Hong Kong
Monywa
Mandalay
Myingyan
Akyab
AKYAB
Kyaukpyu
KYAUKPYU
Thayetmyo
Prome
Toungoo
Henzada
Pegu
Bassein
Rangoon
Syriam
Monaton
Luangprabang
Nan
Lampang
Uttaradit
Bangkok
To Singapore
BURMA OIL FIELDS
Myingyan
SABE
YENANGYAT
Yenangyat
LANYWA
Singu
CHAUK
YENANGYAUNG
Minbu
MINBU
Magwe
YENANMA
PADAUKPIN
Thayetmyo
PYAYE
Prome
OIL FIELDS
GAS FIELDS
ABANDONED FIELD
0 10 25 Miles
0 10 25 Kilometers

Producers of

SULPHUR



For Industry
And Agriculture

Uniformly high purity of 99½% or better

Free of arsenic, selenium and tellurium

TEXAS GULF SULPHUR CO. INC.

Mines: Newgulf and Moss Bluff, Texas

BURMA

BURMA'S oil industry is gradually though slowly emerging from the chaos created by the events of World War II, during which every effort was made by the British to deny the Japanese any use of producing and refining installations. Before the war Burma had produced between 7½ and 8 million barrels annually, and had built up a refining capacity capable of handling the entire production. The success of the "scorched earth" policy is demonstrated by the fact that even now, nearly three years after the close of the war, production from the entire nation is less than 200,000 barrels a year.

At the beginning of 1948, drilling of new wells in the principal producing areas such as the Chauk Fields and Yenangyaung had not yet begun, nor had it been possible to start an exploratory program. However, some progress has been made in reconstruction work on such installations as power stations, workshops, hospital and living quarters, and it has also been possible to recondition a number of those wells which had not been completely junked during the defense destruction at the time of the Japanese invasion. It is from these few wells at Chauk, Yenangyaung, and from shallow hand-dug wells that the production estimated at 200,000 barrels during 1947 has been drawn. Thus far production is limited to the capacity of a small topping plant and an improvised refinery which process enough crude for local requirements.

Some small production, amounting to no more than a few barrels daily is produced illicitly from wells in some of the smaller fields. The output from the Baronga Islands near Akyab and at Kyaukpyu, on the Bay of Bengal is no more than a few barrels daily. Since any substantial production had been denied the Japs during their occupation, it should be possible to materially increase Burma's output once drilling operations are resumed. The principal operating companies in Burma are: Burmah Oil Company, Ltd., which operates at Chauk, Minbu, Yenangyaung and Yenangyat; British Burmah Petroleum Co., Ltd., operating in the Chauk Fields and Yenangyaung; Indo-Burma Petroleum Company, Ltd., operating at Lanywa and Yenangyaung. Many other companies are operating in the above and smaller fields.

The Chauk group of fields is located along a long assymetric anticline, and includes, Chauk, Lanywa and Yenangyat as separate producing areas, one of Burma's most important producing regions. Chauk itself is operated mostly by Burmah Oil Company, Ltd., and a cumulative total of 955 wells had been drilled there before the war. Six producing zones had been proved between 2000 and 5000 feet in the Oligocene, with output ranging from a few barrels to a few hundred barrels per well. No estimates have been made on production from this field alone during the past year. At Lanywa, operated by Indo-Burma Oil Company, it is estimated that some 100 wells were producing at the time of the invasion. In this field, as at Chauk, many wells were drilled on land reclaimed from the Irrawaddy River and a number of wells have been deflected during drilling to meet pay horizons under the river itself. At Yenangyat several hundred wells have been drilled, but here, as at Yenangyaung, there are likewise many native hand-dug wells still operated by the Burmese.

While all of the principal refineries of Burma were destroyed during the war, it is now reported that the Syriam refinery of Burmah Oil Company which had a pre-war capacity of 20,000 barrels daily should be back to full operating capacity sometime in 1949 or 1950. It is already rebuilding

Refineries of Burma

COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery	Operating Status
British Burmah Pet. Co., Ltd.	Thilawa (Rangoon)	2,500	....	Complete	Destroyed
Burmah Oil Co., Ltd.	Syriam (Rangoon)	20,000	2,000	Complete	Destroyed; Rebuilding
Indo-Burma Oil Co., Ltd.	Seikgyi (Rangoon)	3,500	....	Complete	Destroyed
Moola Oil Co.	Minbu	450	None	Skim.	Operating
Nath Singh Oil Co., Ltd.	Yenangyaung	200	None	Skim.	Operating

Engineering and Geological Data on Burma Fields

Province and Field	Range of Gravity Oil (A.P.I.)	Producing Formation		DEPTH (Feet)		Type of Structure
		Kind	Age	Minimum to Top of Pay	Maximum to Bottom of Pay	
Magwe						
Chauk (Singu)	39.6	Sand	Oligocene	2000	5000	Asymmetric
Yenangyaung	37	Sand	Miocene–Oligocene	350	5000	Anticline Anticline
Minbu Dist.						
Minbu	37.8	Sand	Miocene-Oligocene	....	....	Faulted Asymmetric Anticline
Pakokku						
Lanywa	....	Sand	Oligocene	....	....	
Yenangyat	38.8	Sand	Oligocene	400	4200	Faulted Asymmetric Anticline
Thayetmyo						
Pyaye	Gas	Sand	Miocene	....	....	
Yenanma	....	Sand	Oligocene	600	700	Monocline
U. Chindwin						
Indaw	31.1	Sand	Miocene	....	2000	Anticline

CHINA

THE Yumen field of Kansu Province, operated by the Chinese Petroleum Corporation, is still the only producing area in China showing commercial possibilities from the standpoint of producing potential, but remains as a field without probability of real exploitation for some time to come, since the cost of furnishing an outlet to principal consuming centers would be prohibitive in view of the relatively small quantities to be moved.

In 1947 the Yumen field produced a total of 377,451 barrels of crude from 15 wells, production being restricted to the amount which can be processed in a local refinery and absorbed by local demand. Since this demand has not varied substantially, production is about the same as in 1946. A total of six oil wells were drilled in the field in 1947, compared with four completed during 1946. Drilling for the past two years has been localized within the presently producing area, none of the wells having been step-outs designed to enlarge the field which now covers approximately 600 acres. Although still undefined, it is not thought that full definition will more than double the present producing area or present estimated reserve of 45 million barrels. Although there are actually 26 wells in the field, the high paraffin content of the 32-gravity crude makes frequent workovers necessary and it is not often that more than 10 wells are producing at any one time. It is estimated that each well could sustain a flow of perhaps 400 barrels daily if an outlet were provided.

In view of the probable maximum daily output of 4000 to 5000 barrels, the cost of building a pipe line from Yumen to Hankow, the nearest usable port on the Yangtse River would hardly be justified. Such a line would be perhaps 2000 miles

FOR RELIABLE SERVICE

LUCEY

OIL WELL SUPPLIES

Export Distributor of

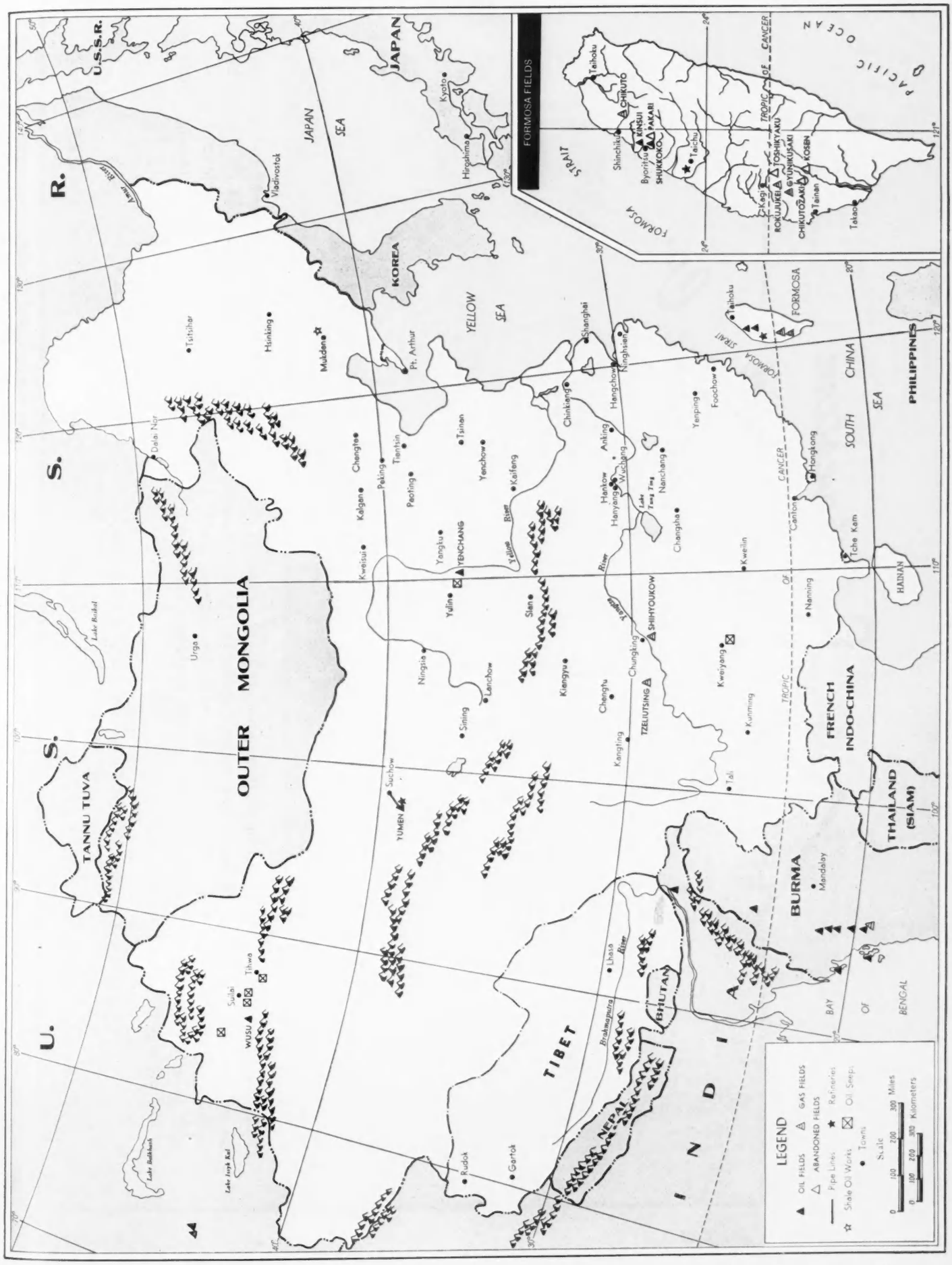
Lucey Diesel Drilling Outfits
Lucey Electric and Diesel-Electric Hook-ups
Wheland Rotary Drilling Equipment
Lucey Boilers and Insulation Casings
Bannon Feed Water Heaters
Beck "Melloblu" Gas Burners
Bullum Oil Burners
Cable Drilling and Fishing Tools
Chain Belt Company — Sprocket and Roller Chain
"Cooper" Die-Formed Basket
Mercury Coring Equipment
New Deal Pipe Cleaning Machines
Pittsburgh Steel Seamless Tubular Products
"Totco" Drift Recorder
Union Wire Rope
Hughes Rock Bits and Tool Joints
Reed Rock Bits and Tool Joints

LUCEY EXPORT CORPORATION

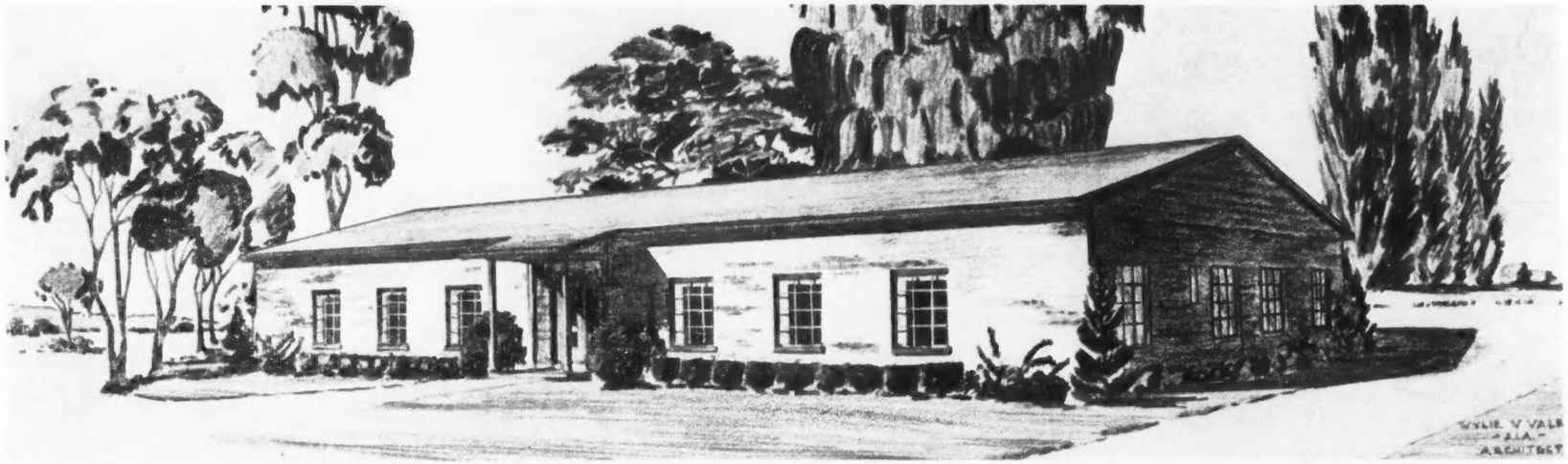
233 BROADWAY . . . NEW YORK 7, N. Y.

Broad Street House, London, E. C. 2, England ● 711 Sterling Building, Houston, Texas ● Calle Defensa 320, Buenos Aires, Argentina
San Fernando, Trinidad, B. W. I. ● 615 8th Avenue West, Calgary, Canada

CHINA


U.S.S.R.
JAPAN
SEA
KOREA
YELLOW SEA
EAST CHINA SEA
SOUTH CHINA SEA
PHILIPPINES
FORMOSA
FORMOSA STRAIT
PACIFIC OCEAN
TROPIC OF CANCER
OUTER MONGOLIA
TANNU TUVA
TIBET
INDIA
BURMA
THAILAND (SIAM)
FRENCH INDO-CHINA
HAINAN
BHUTAN
NEPAL
FORMOSA FIELDS
Taihoku
CHIKUTO
SHINSUI
TAKARI
SHUKKOKO
Taichu
TOHIKYAKU
GYUNIKUSAKI
ROKUJUKEI
CHIKUTOZAKI
KOSEN
Tainan
Takao
Kyoto
Hiroshima
Vladivostok
Mukden
Ft. Arthur
Shanghai
Ninghsien
Hangchow
Chinkiang
Foochow
Yenping
Taihoku
Hongkong
Canton
Tche Kam
Nanning
Kweilin
Changsha
Nanchang
Hankow
Hanyang
Wuchang
Anking
Tientsin
Peking
Tsinan
Yenchow
Kaifeng
Chengtu
Kalgan
Kweisui
Dalai Nor
Hsining
Tsitsihar
Urga
Lake Baikal
Yangku
YENCHANG
Yulin
Sian
Kiangyu
Ningsia
Lanchow
Siming
Suchow
YUMEN
Chengtu
Kangting
TZELIUTSING
Chungking
SHIHYOUKOW
Kweiyang
Kunming
Tali
Suilai
Tihwa
WUSU
Lake Issyk Kul
Lake Bukhash
Rudok
Gartok
Lhasa
Brahmaputra River
Mandalay
LEGEND
OIL FIELDS
ABANDONED FIELDS
GAS FIELDS
Pipe Lines
Refineries
Shale Oil Works
Oil Seeps
Towns
Scale
Miles
Kilometers

The NEW HOME of Southwestern Industrial Electronic Co.



This new SIE plant at Houston more than doubles SIE capacity for producing seismograph equipment, and provides an ultra modern laboratory for advanced seismic research and development. All equipment manufactured by SIE will be completely field-tested at this suburban location, utilizing special field test equipment designed by SIE technicians. Now, with greatly expanded manufacturing facilities and operating personnel, SIE can better serve the ever-increasing needs of the oil exploration industry.

SOUTHWESTERN INDUSTRIAL ELECTRONIC COMPANY

2619 MILAM STREET HOUSTON, TEXAS

DESIGNERS AND MANUFACTURERS OF CUSTOM-BUILT SEISMOGRAPH EQUIPMENT

CHINA—Continued

long and would cost a minimum of $50 million. Tentative plans for the line have been discarded in favor of a shorter line to Chin Chuan, a fairly large city about 60 miles from the field. Plans are to build the line in 1948, but shortages make such a schedule doubtful.

With the end of the war with Japan, and liberation of most of the eastern and southeastern part of the country from active strife, there is starting a re-shifting of the population back toward the seacoast and along the great rivers. This shift will take the principal consuming areas still farther from the site of production, so the authorities are bending their thoughts and energies more toward an examination of the oil possibilities of the seacoast regions. Much of the activity is now being centered in Formosa, where the Japanese had developed several areas and constructed a sizeable refinery. Some 40 drilling rigs were left in the area by the Japanese and these are kept busy as far as is possible by the Chinese, although very little new work has been started in the fields themselves, largely gas areas with comparatively light oil production. Work has consisted of rehabilitation and collection of data to make an intelligent analysis of the area for future development purposes. During the Japanese occupation some 214 wells were drilled, most of which were gas and water wells. The refinery itself has been found to be in poor condition and is gradually being built up as materials become available. It is expected to have a capacity of 15,000 barrels daily when fully restored, and is now in operation at a rate of 3500 to 4000 barrels daily. All of the throughput crude is imported from the Persian Gulf at this time.

Actually the northern provinces of China are only operative during about half of each year as the severe winters preclude year-round operations. Usually it is possible to start sometime in May and continue through until the end of September.

The Szechuan Basin region offers an extensive area for oil exploration, but thus far the only production found has been gas at Tzeliutsing and Shihyoukow, all being in Triassic limestone formations. The two areas are relatively near to Chungking, the Shihyoukow field being within a very few miles of the city itself, and although it is still a one-well field, another well is being drilled there now. The one producer is a relatively high-pressure, low-volume producer, making about 200,000 cubic feet of gas a day under pressure of 1500 pounds. Efforts are now being made to connect this gas source with a consuming center in Chungking, using portable 4-inch and 6-inch pipe taken up from the famous line over the "hump" from Burma. Additional wells are to be drilled to augment the supply.

Other gas areas have no commercial outlet other than as fuel for evaporating brine in the manufacture of salt, and in some localities the gas is bottled and used as fuel for ferry boats and trucks.

It had been hoped by the Chinese that some of the synthetic plants constructed by Japan in Manchuria, and operating on coal and oil shale, would be available to them at the close of formal hostilities, but intelligence now available indicates that these have all been dismantled and moved out by the factions now engaged in the internal strife. It is also thought that the 500-barrel complete refinery at Dairen has been dismantled and moved out by Communistic factions.

INDIA—PAKISTAN

IN AUGUST, 1947, the partition of India into the Dominion of India and Pakistan, also resulted in the partition of India's oil industry, since one of its fields now falls within the division known as the Dominion of India, and the other area lies within the territory controlled by Pakistan.

Pakistan

The Punjab fields, which include Khaur, Dhulian, Joya Mair and Balkassar, are now in Pakistan, and the producing properties are operated by the Attock Oil Company. Production during 1947 from the Dhulian and Khaur fields declined somewhat from the output during 1946, but some oil was taken from the recently discovered Joya Mair and Balkassar fields, with the result that the Punjab actually showed a slight increase with a 1947 production of 330,082 barrels. Dhulian remains as the most important field, producing 36.8-gravity oil from Eocene limestone at depths below 7000 feet. The field is now showing some favorable results from acidization and deepening of wells, but it is felt that these are temporary measures and that the decline will continue.

Development work has continued during 1947 in an effort to define the Balkassar field. Two wells were completed, one producing 300 barrels daily from the Sakesar limestone, a deeper zone from that in which the discovery was completed, and the other halted at a shallow depth due to a water flow which was not cased off. The producer was located a mile from the discovery and proves up a considerable additional area. At the close of the year the fourth well was being drilled.

At Joya Mair the No. 3 deep test was abandoned with mechanical difficulties at a depth of 9016 feet, and no new wells have been started. The field has two producers which are not yet connected by pipe line. Burmah Oil Company completed a semi-exploratory dry hole near Joya Mair during the year, and is now preparing for a well near Attock Oil Company's Balkassar production.

Geological work has been carried on in both Eastern and Western Pakistan, and geophysical surveys have included an area in the Indus Valley near Multan which was worked by refraction seismograph, and reflection surveys in at least four other areas in Western Pakistan.

At the close of the year preparations were in progress by Attock Oil Company to build a pipe line from Balkassar to connect with the Dhulian-Rawalpindi line and furnish a dependable outlet for production.

Attock Oil Company operates two small refineries, a small topping plant in the Dhulian field, and a 6500-barrel plant at Rawalpindi which has cracking capacity of 2500 barrels daily and is connected to Dhulian by a 52-mile pipe line.

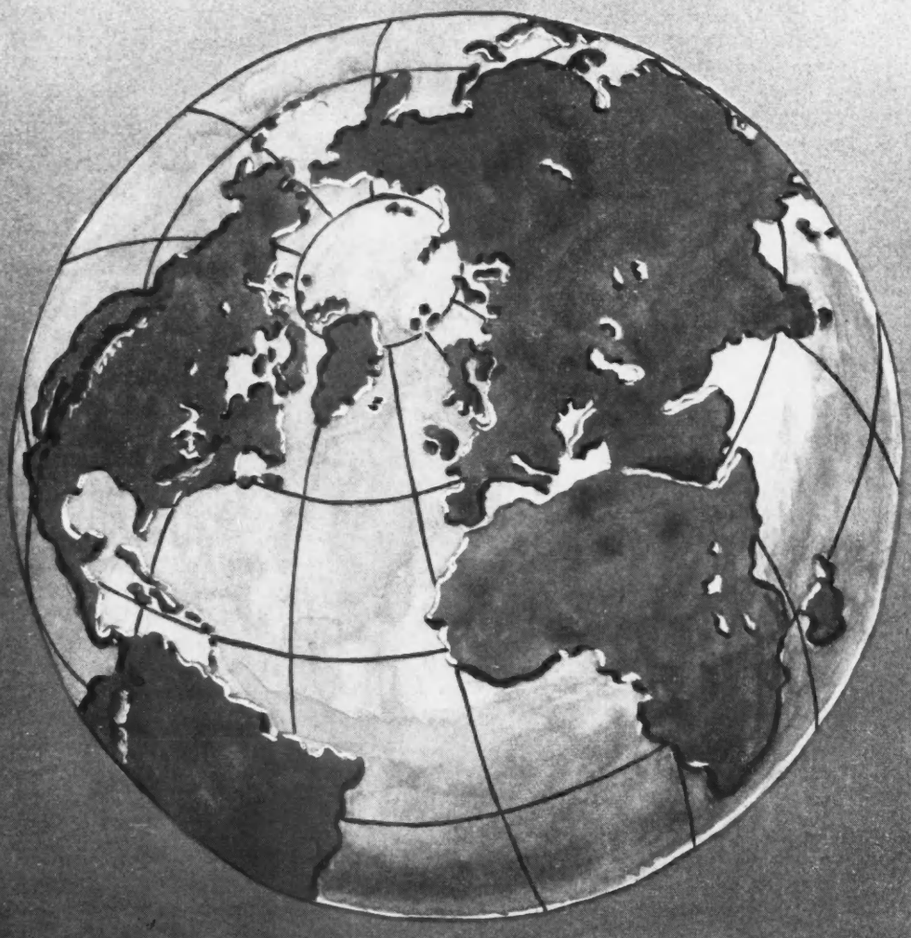
India

The Dominion of India now has only one oil field, the Digboi area in Assam Province, where Miocene sands produce 35.8-gravity oil on an anticlinal structure at a depth of 5000 feet. Production from Digboi remains practically unchanged at 1,860,000 barrels for the year, perhaps 10,000 barrels less than in 1946. The area is operated by Assam Oil Company, Ltd., an affiliate of, and controlled by the Burmah Oil Company, which is also carrying on some exploratory work. Geological parties, and one geophysical crew have been working in Assam and some new exploration drilling is in prospect for 1948. The only such drilling actually in progress during the latter part of 1947 was in Upper Assam where shallow wells had found some small, unprofitable, production.

The Assam Oil Company operates a refinery at Digboi which has a crude charging capacity of 6300 barrels daily, and in addition has cracking capacity of 2000 barrels.

SEISMIC and GRAVITY SURVEYS
in
FOREIGN and DOMESTIC FIELDS

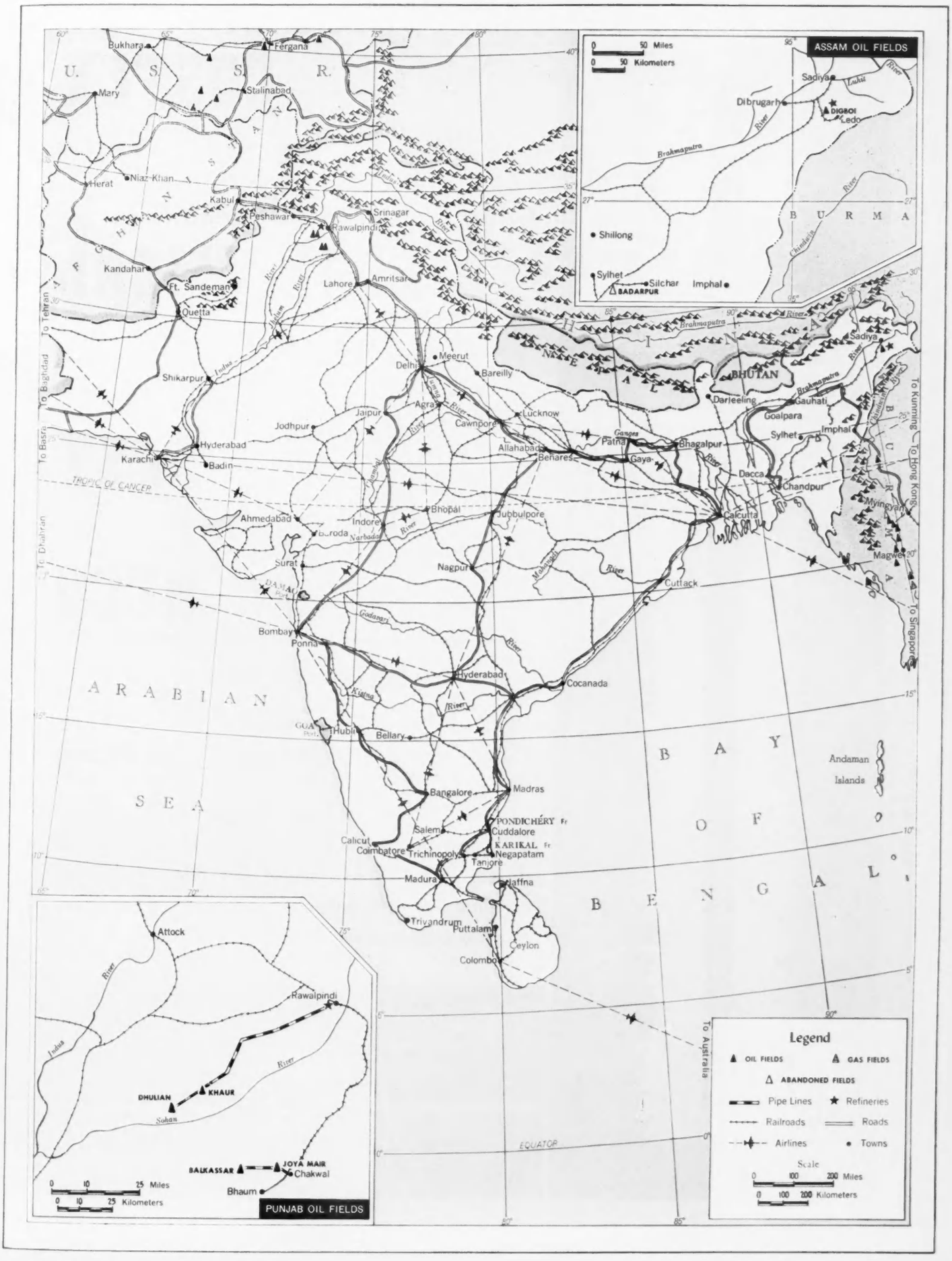
Supervision by men of long
and varied experience in
all branches of exploration

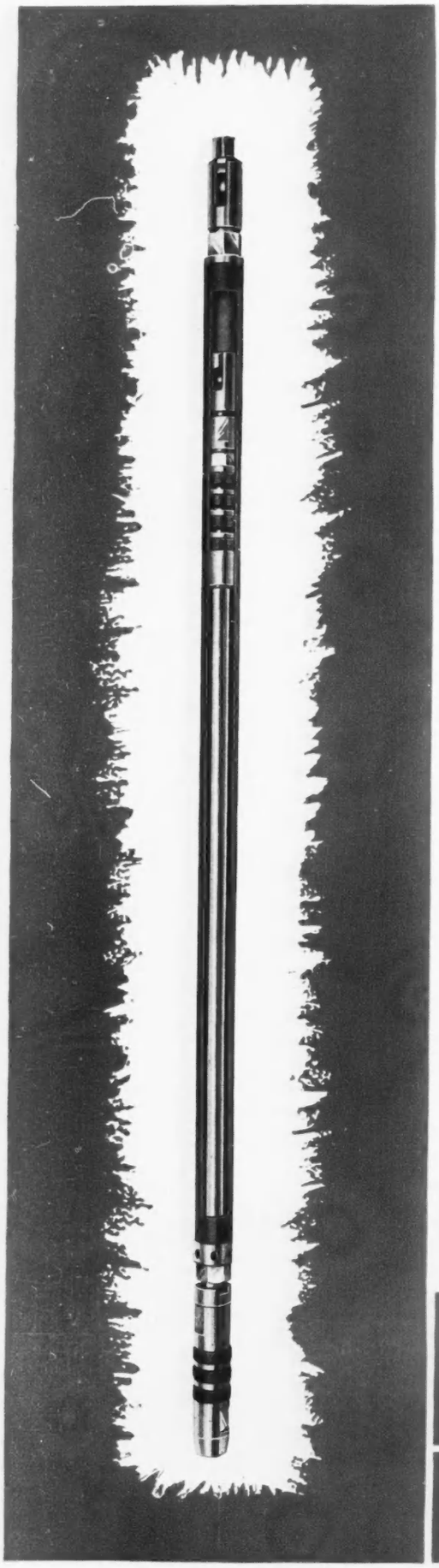


UNIVERSAL
EXPLORATION COMPANY

2044 RICHMOND • HOUSTON, TEXAS

INDIA—PAKISTAN





Pumping failures are

COSTLY

●

Good pumping equipment is

ECONOMICAL

●

Buy the

● **BEST**

Buy

● **NECO**

Shown at the left is a

NECO
Rod Type Traveling Tube Pump
(RWT)

With Cup Plunger

27 years of proven performance in foreign and domestic wells have shown this pump to be unexcelled for efficiency and economy in pumping shallow and medium depth wells.

NORTHRUP EQUIPMENT CO.

PARKERSBURG W. VA. — **KILGORE TEXAS**

NORTHRUP EQUIPMENT CO. TRADE MARK NECO REG. PARKERSBURG, W. VA.

EXPORT REPRESENTATIVE

ACME WELL SUPPLY . . . 19 RECTOR ST., NEW YORK

JAPAN

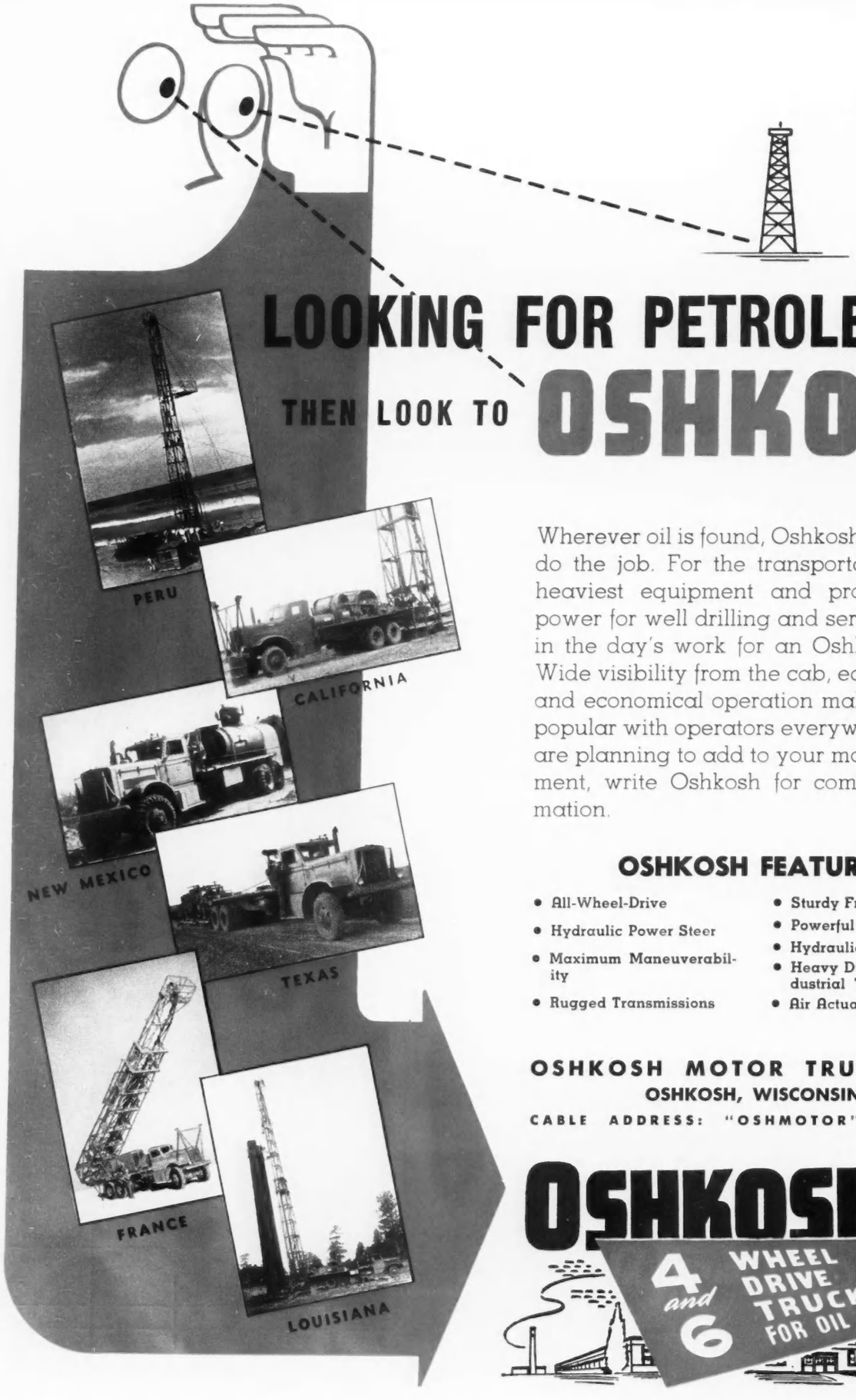
JAPANESE statistics are based on the fiscal year April through March, so that much of the data in the accompanying tables refer to the fiscal rather than the calendar year, although some information is available for comparison purposes.

Crude oil production during the calendar year 1947 averaged about 3500 barrels a day, a decrease from the 3700-barrel average of 1946, while the number of producing wells also dropped from 4319 in March, 1946, to 4058 in March, 1947. Losses in production during the past year were caused by severe floods and gales during most of three months of the year, partially offset for comparison purposes by the 1946 strikes in Imperial Oil Company, but there is no question that the productive potential is down.

Oil Production and Producing Wells in Japan

Prefecture and Field	Operating Company	Year of Discovery	PRODUCING OIL WELLS END OF MARCH, 1947			CRUDE OIL PRODUCTION (Barrels)			
			Flowing	Pumping	Total	Daily Average Dec., 1947	Fiscal Year 1945-46	Fiscal Year 1946-47	Cumulative Through Mar., 1947
HOKKAIDO									
Wakkanai	Imperial Oil Co	1914	0	ND	ND	1	145	94	1,956
Koetoi		1922	0	8	8	5	1,516	1,384	26,085
Masuporo		1923	0	3	3	1	365	333	39,180
Menashi		1915	0	6	6	0	616	308	11,762
Toyotomi		1930	0	2	2	0	296	421	2,541
Yuchi	Hokkaido Oil Dev. Co.	1939	0	6	6	0	1,698	944	4,862
Ishikari	Imperial Oil Co	1903	0	159	159	20	12,876	9,963	836,872
Atsuta		ND	0	8	8	3	1,208	868	18,845
Kinausu	Hokkaido Oil Dev. Co.	1936	0	0	0	0	38	0	126
Fureoi	Imperial Oil Co.	1905	0	139	139	22	8,385	7,661	289,812
Karumai		1906	0	98	98	12	4,887	4,170	374,299
		Total	0	428	428	64	32,030	26,146	1,606,340
AKITA									
Higashi-Hachimori	Imperial Oil Co.	1941	1	13	14	117	75,706	87,123	203,066
Higashi-Hachimori	Daido Oil Co.	1941	0	2	2	14	3,038	1,327	28,620
Higashi-Hachimori	Eguchi Oil Assn.	1941	0	7	7	32	9,762	32,469	103,986
Nishi-Hachimori	Imperial Oil Co.	1938	0	8	8	1	1,296	1,132	12,108
Nishi-Hachimori	Daido Oil Co.	1938	0	20	20	17	4,642	14,958	87,280
Iwako		1939	0	10	10	0	566	428	9,951
Asanai	Imperial Oil Co.	1940	0	17	17	3	1,277	912	4,824
Toyokawa		1912	0	273	273	27	20,222	17,650	
Toyokawa	Daido Oil Co.	1912	0	42	42	4	1,554	1,547	5,021,690
Urayama	Imperial Oil Co.	1912	0	109	109	14	8,416	5,975	
Kurokawa		1912	0	116	116	40	27,261	19,568	7,308,445
Michikawa		1922	0	53	53	59	14,649	7,668	
Michikawa	Karita Industrial Co.	1922	0	1	1	0	63	107	4,050,779
Asahikawa	Imperial Oil Co.	1908	0	142	142	50	44,961	17,260	
Asahikawa	Karita Industrial Co.	1908	0	17	17	3	1,346	1,032	
Niida	Imperial Oil Co.	1938	0	6	6	6	3,478	3,327	119,692
Yabase		1934	15	267	282	957	522,454	463,988	8,914,842
Toyoiwa		1902	0	3	3	6	1,522	2,566	22,889
Katsurane		1919	0	84	84	13	4,453	6,240	576,749
Hanekawa		1919	0	20	20	7	2,208	2,120	206,595
Katte		1919	0	90	90	17	8,756	8,743	583,284
Uchimichika		1921	0	2	2	0	19	57	31,601
Matsugasaki		1941	0	0	0	0	19	0	333
Hibiki	Nippon Oilfield Co.	ND	0	8	8	2	692	736	83,575
Kimigano	Ishikawa	ND	0	0	0	0	25	25	ND
		Total	16	1,310	1,326	1,389	758,385	696,958	27,370,309
YAMAGATA									
Innai	Imperial Oil Co.	1922	1	105	106	211	99,797	89,739	3,999,125
Kamioguni		ND	0	40	40	50	21,732	22,380	1,079,358
Katsurazaka		1928	2	22	24	75	35,142	29,381	261,626
Kotaki		1938	0	35	35	31	11,467	8,428	162,559
Kamihama		1940	0	12	12	34	12,379	23,116	45,709
Chokaizan		1922	0	12	12	25	20,329	10,485	341,333
Ishinazaka		1944	1	14	15	176	110,943	100,898	213,608
		Total	4	253	257	602	311,789	284,427	6,103,318
NIIGATA									
Echigo-Kurokawa	Imperial Oil Co.	1941	0	59	59	22	13,027	8,982	99,546
Echigo-Kurokawa	Daido Oil Co.	1941	0	17	17	13	5,051	7,215	20,568
Echigo-Kurokawa	Hokuriku Oil Assn.	1941	3	40	43	18	13,071	9,422	44,520
Shibata	Imperial Oil Co.	1945	1	8	9	30	17,549	16,348	39,721
Kaji	Daido Oil Co.	1945	0	2	2	3	1,409	3,560	7,881
Tsukioka		1941	0	1	1	0	50	25	289
Niitsu	Imperial Oil Co.	1874	3	701	704	276	125,536	103,502	16,371,335
Niitsu	Daido Oil Co.	1874	0	14	14	1	1,491	1,346	5,007
Nutsu	Hokuriku Oil Assn.	1874	0	140	140	16	10,441	7,749	41,250
Ohmo	Imperial Oil Co.	1916	0	53	53	21	13,700	11,058	1,339,512
Higashiyama		1874	0	383	383	178	71,417	66,233	6,791,590
Kengamine		1941	0	1	1	0	359	742	2,246
Torigoe		1898	0	71	71	6	2,107	2,610	523,152
Izumozaki	Tone Boring Co.	ND	0	3	3	0	157	164	899
Ishiji	Imperial Oil Co.	1934	0	11	11	0	767	704	27,582
Amaze		1873	0	7	7	1	635	453	165,509
Miyagawa		1895	0	39	39	8	4,000	3,956	1,932,584
Nishiyama		1898	0	202	202	111	34,658	32,041	12,069,164
Betsuyama		ND	2	27	29		21,524	11,177	366,638
Takamachi		1924	0	68	68	21	13,781	8,234	3,214,485
Kashiwazaki		1936	0	2	2	0	283	195	8,536
Kuwazone		1945	0	2	2	0	31	25	176
Maki		1900	0	168	168	13	4,963	4,717	905,087
Gohtsu		1902	0	14	14	4	2,145	1,887	39,463
		Total	9	2,033	2,042	742	358,152	302,345	44,016,740
SHIZUOKA									
Sagara	Imperial Oil Co.	1908	0	2	2	0	44	38	496
Sagara	Saito Oil Co.	1908	0	3	3	0	31	31	465
		Total	0	5	5	0	75	69	961
Total—All Fields			29	4,029	4,058	2,797*	1,460,431	1,309,945	79,097,668

ND—No Data. * Unusually low; Electric Power Supply disrupted by gales in November and December.



LOOKING FOR PETROLEUM?

THEN LOOK TO OSHKOSH

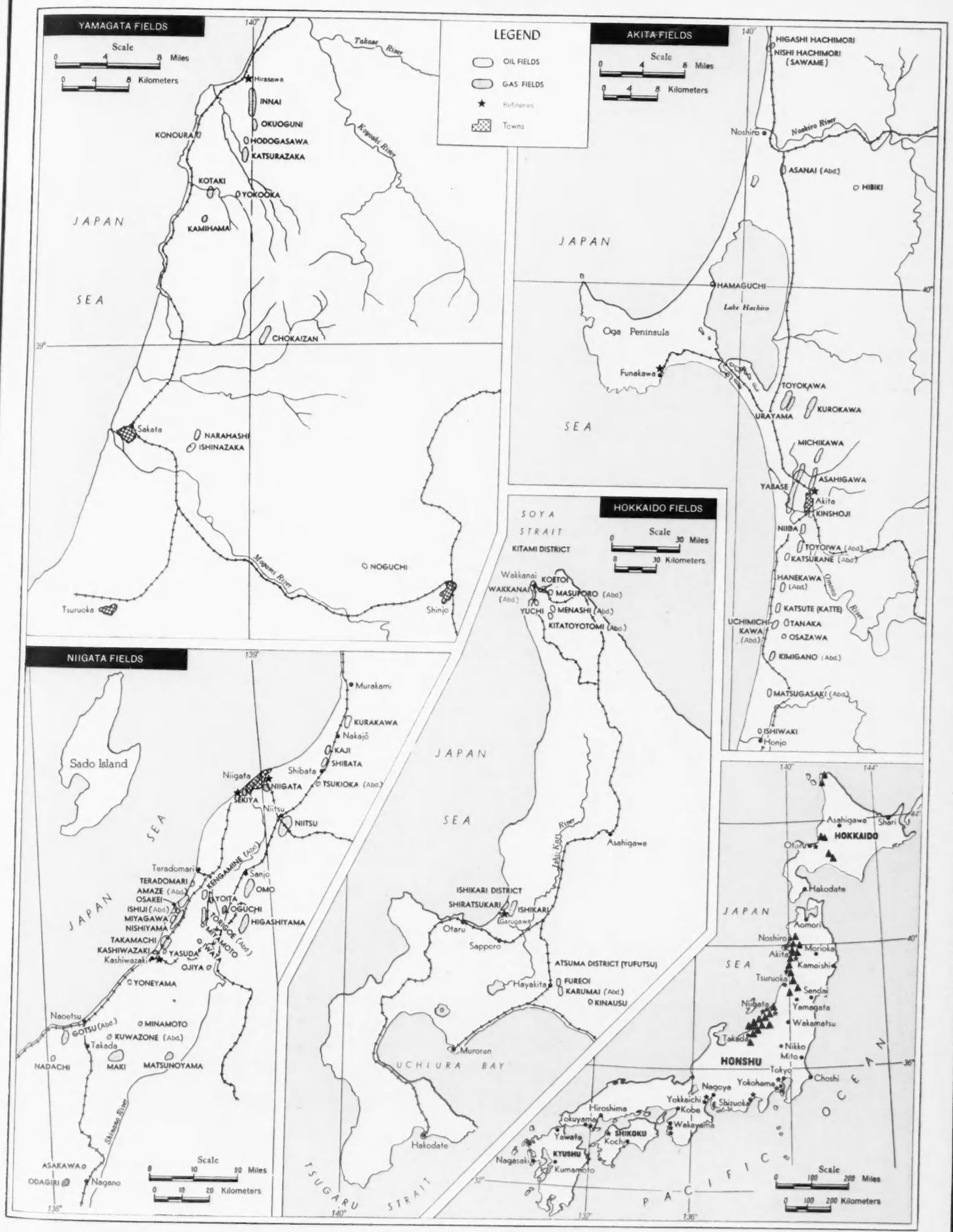
Wherever oil is found, Oshkosh Trucks can do the job. For the transportation of the heaviest equipment and providing the power for well drilling and servicing is all in the day's work for an Oshkosh Truck. Wide visibility from the cab, easy steering and economical operation make Oshkosh popular with operators everywhere. If you are planning to add to your mobile equipment, write Oshkosh for complete information.

OSHKOSH FEATURES

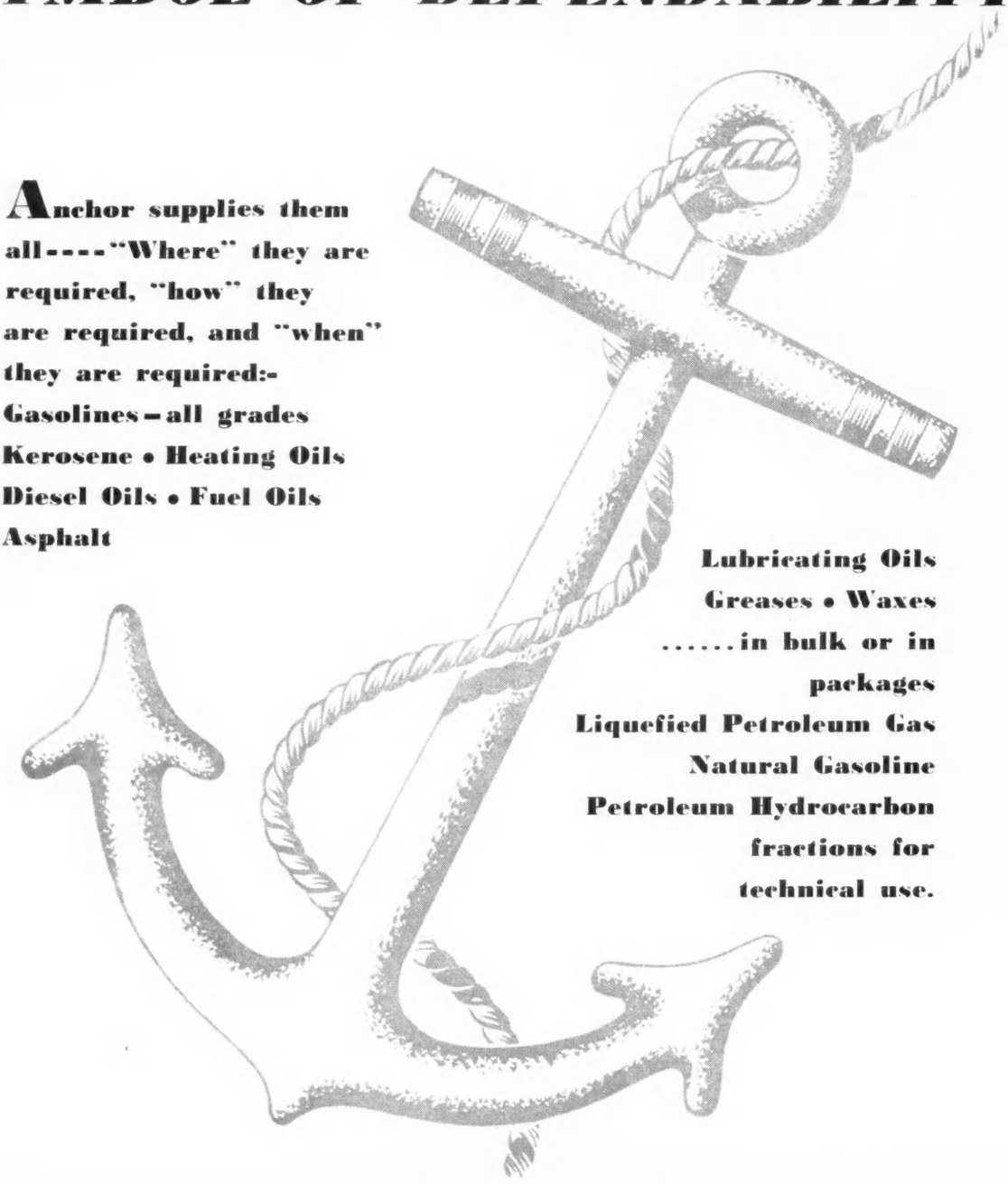
- All-Wheel-Drive
- Hydraulic Power Steer
- Maximum Maneuverability
- Rugged Transmissions
- Sturdy Frames and Axles
- Powerful Engines
- Hydraulic Coupling
- Heavy Duty, Oversize Industrial Type Radiator
- Air Actuated Brakes

OSHKOSH MOTOR TRUCK, INC.
OSHKOSH, WISCONSIN
CABLE ADDRESS: "OSHMOTOR" OSHKOSH

JAPAN


YAMAGATA FIELDS
Scale
0 4 8 Miles
0 4 8 Kilometers
Takase River
Hirasawa
INNAI
OKUOGUNI
KONOURA
HODOGASAWA
KATSURAZAKA
Kogoshi River
KOTAKI
YOKOOKA
KAMIHAMA
JAPAN
SEA
CHOKAIZAN
Sakata
NARAHASHI
ISHINAZAKA
Mogami River
NOGUCHI
Tsuruoka
Shinjo
LEGEND
OIL FIELDS
GAS FIELDS
Refineries
Towns
AKITA FIELDS
Scale
0 4 8 Miles
0 4 8 Kilometers
HIGASHI HACHIMORI
NISHI HACHIMORI (SAWAME)
Noshiro
Noshiro River
ASANAI (Abd.)
HIBIKI
JAPAN
HAMAGUCHI
Lake Hachiro
Oga Peninsula
Funakawa
SEA
TOYOKAWA
KUROKAWA
URAYAMA
MICHIKAWA
ASAHIGAWA
YABASE
Akita
KINSHOJI
NIIBA
TOYOIWA (Abd.)
KATSURANE (Abd.)
HANEKAWA (Abd.)
Omono River
KATSUTE (KATTE)
UCHIMICHI-KAWA (Abd.)
TANAKA
OSAZAWA
KIMIGANO (Abd.)
MATSUGASAKI (Abd.)
ISHIWAKI
Honjo
HOKKAIDO FIELDS
SOYA STRAIT
Scale
0 30 Miles
0 30 Kilometers
KITAMI DISTRICT
Wakkanai
WAKKANAI (Abd.)
KOETOI
MASUPORO (Abd.)
YUCHI
MENASHI (Abd.)
KITATOYOTOMI (Abd.)
NIIGATA FIELDS
Murakami
KURAKAWA
Nakajō
KAJI
SHIBATA
Sado Island
Niigata
Shibata
NIIGATA
TSUKIOKA (Abd.)
SEKIYA
Niitsu
NIITSU
SEA
JAPAN
SEA
Teradomari
KENGAMINE (Abd.)
Sanjo
OMO
TERADOMARI
AMAZE (Abd.)
OSAKEI
ISHIJI (Abd.)
MIYAGAWA
NISHIYAMA
YOITA
OGUCHI
HIGASHIYAMA
TOKAMACHI
TAKAMACHI
KASHIWAZAKI
Kashiwazaki
YASUDA
OJIYA
YONEYAMA
Naoetsu
GOTSU (Abd.)
MINAMOTO
KUWAZONE (Abd.)
Takada
NADACHI
MAKI
MATSUNOYAMA
Shinano River
ASAKAWA
ODAGIRI
Nagano
Scale
0 10 20 Miles
0 10 20 Kilometers
JAPAN
SEA
Ishikari River
Asahigawa
ISHIKARI DISTRICT
SHIRATSUKARI
ISHIKARI
Otaru
Sapporo
Hayakita
ATSUMA DISTRICT (YUFUTSU)
FUREOI
KARUMAI (Abd.)
KINAUSU
Muroran
UCHIURA BAY
Hakodate
TSUGARU STRAIT
HOKKAIDO
Asahigawa
Shari
Otaru
Hakodate
JAPAN
Aomori
Noshiro
Morioka
Akita
Kamaishi
SEA
Tsuruoka
Sendai
Yamagata
Niigata
Wakamatsu
Takada
Nikko
Mito
HONSHU
Tokyo
Choshi
Yokohama
Nagoya
Yokkaichi
Shizuoka
Kobe
Hiroshima
Tokuyama
Wakayama
SHIKOKU
Kochi
Yawata
KYUSHU
Nagasaki
Kumamoto
PACIFIC OCEAN
Scale
0 100 200 Miles
0 100 200 Kilometers

SYMBOL OF DEPENDABILITY



Anchor supplies them all----"Where" they are required, "how" they are required, and "when" they are required:-
Gasolines – all grades
Kerosene • Heating Oils
Diesel Oils • Fuel Oils
Asphalt

Lubricating Oils
Greases • Waxes
.....in bulk or in packages
Liquefied Petroleum Gas
Natural Gasoline
Petroleum Hydrocarbon fractions for technical use.

ALL PETROLEUM PRODUCTS

ANCHOR OIL COMPANY

a good name to remember

Cable Address • "ANCHOROIL" • Houston 2, Texas, U. S. A.

AFFILIATED WITH ANCHOR PETROLEUM COMPANY, TULSA, OKLA.

JAPAN—Continued

Most producing fields are fully drilled up and at depletion stage, and the exploratory program of 1946 failed to prove new reserves. The program was based more on drilling capacity than on sound geological evidence. This situation is being studied by the Petroleum Exploration Advancement Committee, established in January, 1947, as an advisory body to the Oil Section of the Mining Bureau. An organized program of study, together with geological and geophysical work, with exploratory wells planned and assigned to principal producing companies for drilling, is now beginning to show results. In August, 1947, Japan's first discovery since the cessation of hostilities was made at Narahashi in Yamagata Prefecture, and a successful extension was made on the west flank of the Yabase field as well as an extension to the Betsuyama field. In addition new pays have been found in the Omonogawa area. New structures have been located by seismic and gravitymeter work in Yamagata and Niigata which are in line for drilling. However, it will likely be some time before discovery rate and exploitation drilling can be expected to balance the declining production.

With consumption of products at 4,756,100 barrels, Japan's production of 1,309,945 barrels in the same period is less than a third of its overall needs, while products refined fill only about 21 percent of demand.

Refining capacity is more than sufficient for processing indigenous crude, and the plants formerly used to handle imported crude have been shut down until such time as imports of crude oil are again permitted.

Refineries of Japan

COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery	Operating Status
Nippon Oil Co.	**Akita**				
	Akita	3962	None	Skim & Asphalt	Operating
Nippon Mining Co.	Funakawa	2516	None	Skim	Operating
Showa Oil Co.	Hirasawa	743	None	Lube, asphalt	Operating
Maruzen Oil Co.	**Ehime**				
	Matsuyama	1761	None	Lube	Shut Down
Nippon Oil Co.	**Hokkaido**				
	Carugawa	252	None	Skimming	Operating
Showa Oil Co.	**Kanagawa**				
	Kawasaki	4403	None	Skimming, lube	Shut Down
Koa Oil Co.	Yokohama	603	None	Lube	Shut Down
Nippon Oil Co.	Yokohama	5887	975	Skim-Crk-lube	Shut Down
Daikyo Oil Co.	**Mie**				
	Yokkaichi	1384	None	Lube	Shut Down
Maruzen Oil Co.	**Nagasaki**				
	Imafuku	113	None	Lube	Shut Down
Nippon Oil Co.	**Niigata**				
	Kashiwazaki	1258	None	Skimming, wax	Operating
	Niigata	2012	None	Lube, asphalt	Operating
Showa Oil Co.	Niigata	1258	943	Skim-crk-lube-asphalt	Operating
Toa Fuel Co.	**Shizuoka**				
	Shimizu	1887	None	Lube	Shut Down
Showa Oil Co.	**Wakayama**				
	Kainan	252	None	Lube	Shut Down
Maruzen Oil Co.	Shimotsu	226	None	Lube	Shut Down
Nippon Oil Co.	**Yamaguchi**				
	Kudamatsu	2516	None	Skimming	Shut Down
Total	17 Plants	31,033	1918		

Wildcats Completed in Japan in 1947

Prefecture	Company	Well Name	Date Completed	Depth, (Feet)	Results
AKITA	Imperial Oil Co.	Ukawa R-2	Aug. 23	1365	Abandoned
YAMAGATA	Imperial Oil Co.	Konoura R-8	Dec. 20	1790	Abandoned
	Imperial Oil Co.	Sakata R-1	July 4	3620	Abandoned
	Imperial Oil Co.	Yadaregawa R-2	Aug. 29	2700	Abandoned
	Imperial Oil Co.	Narahashi R-1	April 18	1695	3 bbl. (oilsand in Shibikawa formation, upper Pliocene)
	Imperial Oil Co.	Narahashi R-2	April 10	1690	Abandoned
	Imperial Oil Co.	Narahashi R-3	Aug. 28	732	30 bbl. (oilsand in Shibikawa formation, upper Pliocene)
	Imperial Oil Co.	Nishi-Ishinazaka R-3	May 9	1658	Abandoned
NIIGATA	Imperial Oil Co.	Yoita R-2	May 29	3550	Abandoned
	Imperial Oil Co.	Shiiva R-1	April 26	3440	Abandoned
	Imperial Oil Co.	Nishinakadori R-7	Mar. 29	4920	Abandoned
	Imperial Oil Co.	Kuwazone R-5	May 22	1650	Abandoned
	Imperial Oil Co.	Kuwazone R-5A	May 2	341	Abandoned
Total		13 Wells			

Drilling in Japan in 1947

Prefecture and Fields	Wells Completed in Fields in 1947					Field Wells Drilling and Shut Down at End of 1947		
				Total				
	Oil	Gas	Dry	Wells	Footage	Drlg.	SD	Total
HOKKAIDO								
Koetoi	0	0	1	1	3,304	0	0	0
Fureoi	0	0	1	1	920	0	0	0
AKITA								
Nishi-Hachimori	2	0	0	2	4,580	1	0	1
Higashi-Hachimori	2	0	0	2	3,775	2	1	3
Yabase	8	0	4	12	34,050	4	2	6
Toyoiwa	0	0	1	1	3,240	0	0	0
Wildcat	0	0	1	1	1,365	0	0	0
NIIGATA								
Kurokawa	1	0	3	4	5,280	3	0	3
Haguro	2	1	1	4	3,820	0	0	0
Shibata	2	0	1	3	6,560	2	0	2
Niitsu	0	0	1	1	4,475	0	0	0
Taya	0	0	1	1	4,090	0	0	0
Betsuyama	2	0	0	2	11,190	1	0	1
Gohtsu	0	0	1	1	3,940	0	0	0
Odagiri	0	0	0	0	0	0	1	1
Niigata	0	3	0	3	4,750	0	0	0
Sekiya	0	1	0	1	1,681	1	0	1
Oguchi	0	0	0	0	0	1	0	1
Garameki	0	0	1	1	1,970	0	0	0
Tomine	0	0	1	1	1,970	0	0	0
Shimohama	0	0	1	1	1,310	0	0	0
Wildcats	0	0	5	5	13,201	0	0	0
YAMAGATA								
Katsurazaka	1	0	0	1	1,958	0	2	2
Kamihama	1	0	1	2	2,040	1	1	2
Chokaizan	0	0	0	0	0	0	1	1
Ishinazaka	0	0	1	1	676	0	0	0
Wildcats	2	0	5	7	13,885	0	0	0
Total	23	5	31	59	144,030	16	8	24

PHILIPPINE ISLANDS

THE Far East Development Company, the only firm now actively operating in the Philippine Islands, drilled a deep wildcat on the island of Cebu during 1947 and plans to start a series of two wildcats on the island of Luzon during 1948. According to current plans of the company, the next two tests are to be drilled on a structure on Bondoc Peninsular, situated in Southern Luzon and about 175 miles northwest of Cebu. It is in an isolated area and operations will be hampered by the supply and transportation problems. No roads exist in the vicinity and all equipment and supplies will have to be brought in by boat and by air. The structure has a major fault splitting it longitudinally, and a well is to be drilled on each side. The test on the down-thrown side is to be taken to at least 6500 feet.

The company's Cebu 2, on which operations were suspended at a depth of 9950 feet in December, 1947, has not been abandoned. It was drilled in only 141 days and had several showings of oil before being suspended after reaching schist basement. The shows were not believed of commercial quantity, but some testing may be done later. Drilling progress on the well may be considered especially good in view of the fact that 2350 feet of the hole was cored, considerable testing was done, and Filipino crews had to be trained in the unfamiliar work. All equipment and most of the food and supplies had to be brought in from the United States.

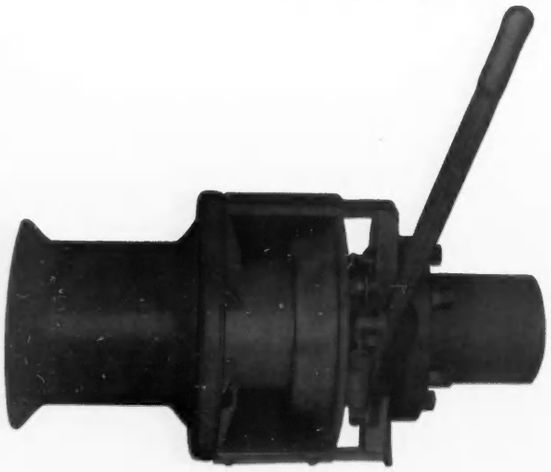
The hole had 9⅝-inch casing set at 7624 feet with 7-inch liner to the bottom which was perforated to allow testing all the way up, but no production was obtained.

Star Performers

ON RIGS THE WORLD OVER

For over twenty years Foster Catheads have been used on rigs the world over and their records of speed, safety and dependability have become standards of cathead performance.

For the utmost in cathead performance . . . for quicker trips in and out . . . equip your rigs with Foster Catheads.

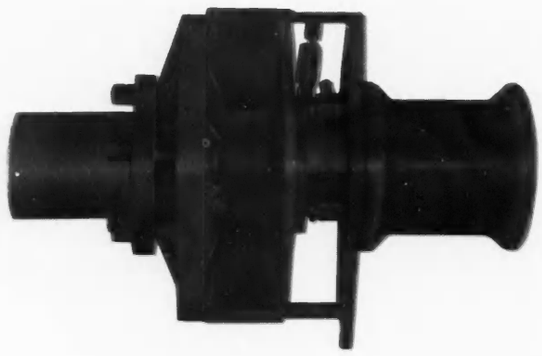


FOSTER MASTER BREAKOUT CATHEAD

Driller is in constant control of power applied to jerkline . . . slower jerkline speeds used . . . no positive clutch to accidentally engage . . . friction clutch and small drum permit instant engagement without reducing lineshaft speed . . . no metal-to-metal impact . . . no brakes required . . . equipped with air or manual controls.

FOSTER SPINNING CATHEAD

Relieves operator of handling spinning line . . . line stops automatically and instantaneously when handle is released . . . pipe is spun smoothly under low clutch pressures . . . plenty of power for tonging . . . friction material is treated for heat resistance . . . drum does not crawl when clutch is disengaged.



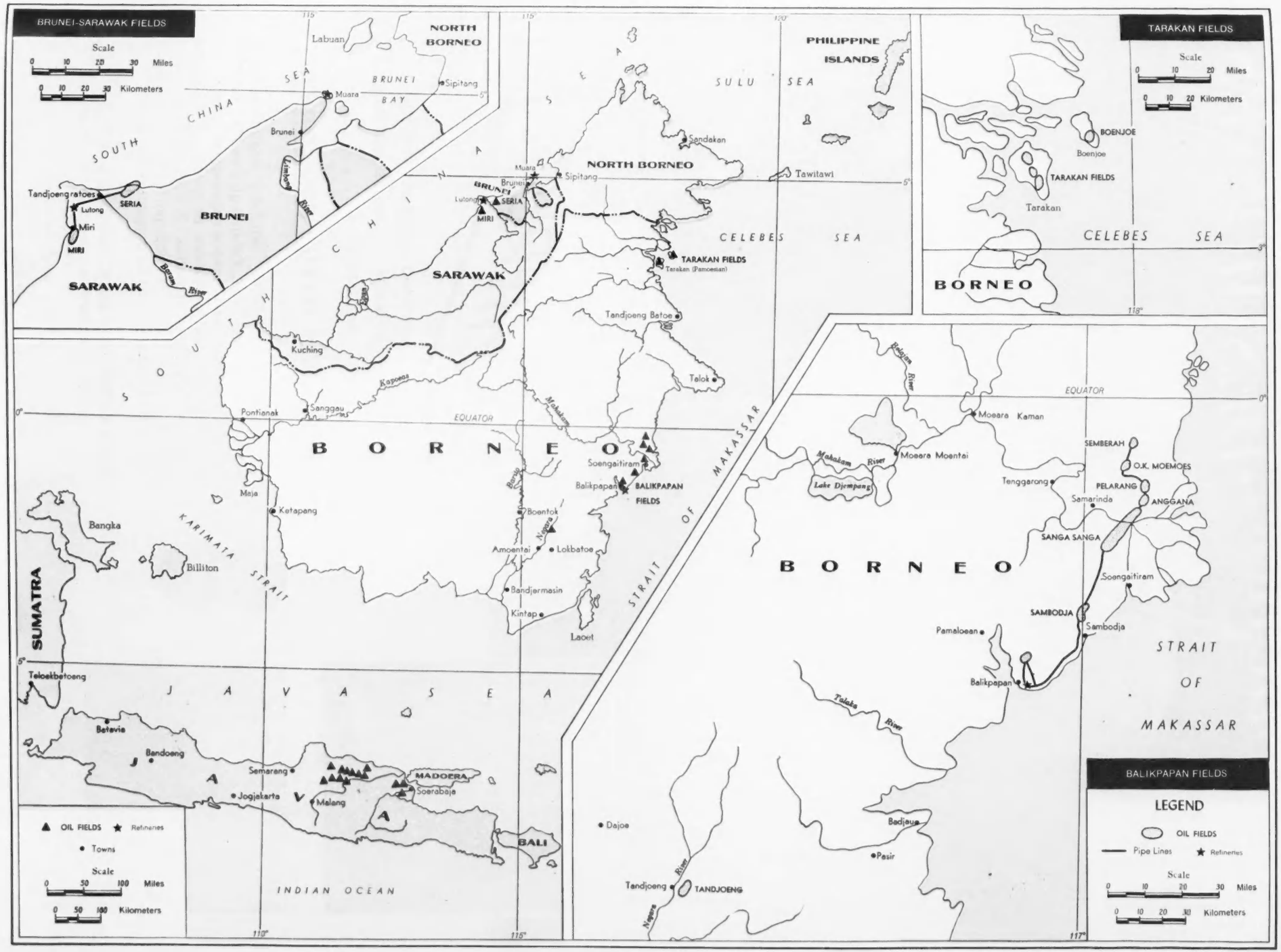
SOLD ONLY THROUGH SUPPLY STORES

FOSTER CATHEAD COMPANY

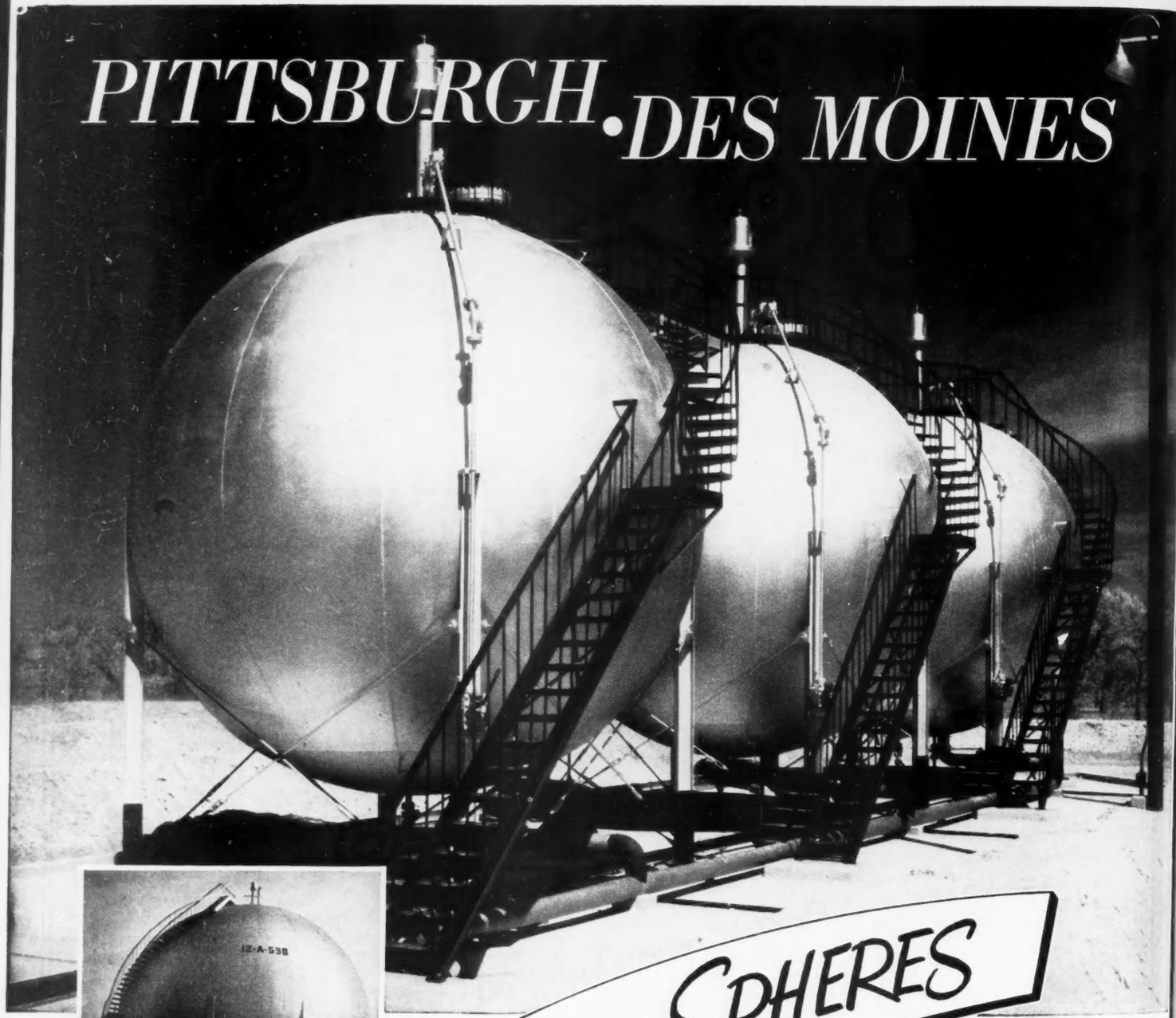
P. O. BOX 1675 — WICHITA FALLS, TEXAS

FACTORY REPRESENTATIVES:

Lloyd Hopeman	Tillery & Parks	Nicholas A. D'Arcy	Allen C. Evans
Seminole, Okla.	Odessa, Texas	Huntington Park, Cal.	Houston, Texas


BRUNEI-SARAWAK FIELDS
Scale
0 10 20 30 Miles
0 10 20 30 Kilometers
Labuan
NORTH BORNEO
SEA
BRUNEI BAY
Sipitang
Muara
Brunei
CHINA
SOUTH
Tandjoengratoes
SERIA
Lutong
Miri
MIRI
BRUNEI
SARAWAK
Baram River
Limbang River
Sandakan
NORTH BORNEO
Tawitawi
PHILIPPINE ISLANDS
SULU SEA
CELEBES SEA
TARAKAN FIELDS
Tarakan (Pamoesian)
Tandjoeng Batoe
Kuching
Kapoeas
Pontianak
Sanggau
EQUATOR
Telok
Mahakam
Soengaitiram
Balikpapan
BALIKPAPAN FIELDS
Boentok
Ketapang
Maja
Bangka
Billiton
KARIMATA STRAIT
Amoentai
Lokbatoe
Bandjermasin
Kintap
Laoet
STRAIT OF MAKASSAR
SUMATRA
Teloekbetoeng
JAVA SEA
Batavia
Bandoeng
Semarang
Jogjakarta
Malang
MADOERA
Soerabaja
BALI
INDIAN OCEAN
OIL FIELDS
Refineries
Towns
Scale
0 50 100 Miles
0 50 100 Kilometers
TARAKAN FIELDS
Scale
0 10 20 Miles
0 10 20 Kilometers
BOENJOE
Boenjoe
TARAKAN FIELDS
Tarakan
CELEBES SEA
BORNEO
Rebiram River
Moeara Kaman
Mahakam River
Moeara Moentai
Lake Djempang
SEMBERAH
O.K. MOEMOES
Tenggarong
PELARANG
Samarinda
ANGGANA
SANGA SANGA
BORNEO
Soengaitiram
SAMBODJA
Sambodja
Pamaloean
Balikpapan
STRAIT OF MAKASSAR
Talaka River
Dajoe
Badjaoe
Pasir
Tandjoeng
TANDJOENG
Negara River
BALIKPAPAN FIELDS
LEGEND
OIL FIELDS
Pipe Lines
Refineries
Scale
0 10 20 30 Miles
0 10 20 30 Kilometers

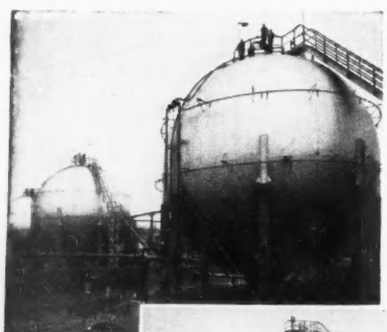
PITTSBURGH•DES MOINES



STEEL SPHERES

DESIGNED AND BUILT FOR THE STORAGE OF LIQUIDS AND GASES UNDER PRESSURE....

Provide better service and economy



Thoroughly researched, skillfully engineered and painstakingly fabricated, Pittsburgh-Des Moines Steel Spheres meet every performance requirement for pressure storage of your volatile liquids or gases—with definite economy benefits in operation. A consultation on your storage problems can develop pertinent, helpful facts toward their solution. *Let us cooperate with you!*

PITTSBURGH • DES MOINES STEEL CO.

Plants at PITTSBURGH, DES MOINES and SANTA CLARA

Sales Offices at:

PITTSBURGH . . . 3490 Neville Island
NEW YORK Room 972, 270 Broadway
CHICAGO, 1294 First Natl. Bank Bldg.
SANTA CLARA, CAL. 697 Alviso Road
DES MOINES . . . . . 991 Tuttle St.
DALLAS . . . . 1295 Praetorian Bldg.
SEATTLE . . . 598 First Avenue, South

EAST INDIES

ALTHOUGH many of the fields in the East Indies are still isolated insofar as any work of rehabilitation is concerned, considerable progress was made during 1947 in Sumatra, Borneo and Brunei in building up the depleted production suffered by the Far East during the war years. Although still short of the pre-war level of 157,000 barrels daily, the entire region was producing at the end of the year at a rate of 110,343 barrels daily, and the fields of Borneo and Brunei were making such advances as to assure they would be above their pre-war levels before the end of 1948. The rate at which production is being stepped up is indicated by the overall average for the year of 58,163 barrels daily as compared with the average at the end of the year.

Drilling of new wells is still concentrated largely in Borneo and Brunei, but for the first time since the beginning of hostilities it was possible to drill new wells in some of the Sumatra and Java areas.

The extent to which some of the fields have been able to produce, both now and during the Japanese occupation, is remarkable considering the amount of demolition work done by both the Allied forces and later by the Japanese. Despite well-planned and well executed destruction, the Japs were able to produce an estimated 3¼ million barrels of oil from Java and nearly 10 million barrels from Sumatra. 1947 production from Sumatra fields amounted to 3,857,000 barrels.

Drilling in East Indies Fields

Country and Field	WELLS COMPLETED IN 1947					Wells Drilling and Shut Down End of 1947		
				Total				
	Oil	Gas	Dry	Wells	Footage	Drlg.	S.D.	Total
Borneo								
Tarakan	37	..	..	37	41,547	1	..	1
Brunei								
Seria	21	..	..	21	83,572	2	20 (shut in)	22
Java								
Kroeka	..	2	1	3	677	..	..	..
Netherlands New Guinea								
N. Klamono	..	..	..	..	410	1	..	1
Sarawak								
Miri	1	..	..	1	8,227	1	19 (shut in)	20
Sumatra								
Tolang Djimar	1	..	..	1	17,132	3	..	3
Sambodja	4	..	..	4	7,913	1	..	1
Tandjoeng	1	..	..	1	7,503	1	..	1
Total	65	2	1	68	166,981	10	39	49

Oil Production and Producing Wells in East Indies Fields

COUNTRY REGION AND FIELD	Operating Company	Year of Discovery	PRODUCING OIL WELLS END OF 1947			CRUDE OIL PRODUCTION (Barrels)			
			Flowing	Art. Lift	Total Producing	Daily at End of 1947	Year 1946	Year 1947	Cumulative Through 1947
BORNEO									
Anggana-Moeara	N. V. de Bataafsche Pet. Mij. (Shell)	1902	3	56	59	4,200	254,000	860,000	58,945,000
Sambodja		1910	1	12	13	700	18,000	84,000	52,754,000
Sanga Sanga		1897	1	46	47	2,700	492,000	1,017,000	142,036,000
Tandjoeng		1938	3		3	n. a.	73,000	72,000	272,000
Tarakan		1906	7	315	322	5,600	1,169,000	1,841,000	155,784,000
BRUNEI									
Seria	British Malayan Pet. Co., Ltd.	1929	56	84	140	49,500		12,991,000	65,343,000
CERAM									
Boela-Lemoen	N. V. de Bataafsche Petroleum Mij.	1897							8,203,000
JAVA									
Kawengan	N. V. de Bataafsche Pet. Mij. (Shell)	1926							38,972,000
Kroeka		1929		44	44	1,150	92,000	326,000	6,390,000
Ledok		1896							21,125,000
Loesi	N. V. Standard-Vacuum Pet. Mij.	1932							505,000
Ngliron		1940							10,000
Nglobo-Semanggi Banjoeasin	N. V. de Bataafsche Pet. Mij. (Shell)	1897							18,044,000
Petak	N. V. Standard-Vacuum Pet. Mij.	1914							781,000
Soerabaja	N. V. de Bataafsche Pet. Mij. (Shell)	1896							33,369,000
Tremboel	N. V. Standard-Vacuum Pet. Mij.	1917							355,000
NETHERLANDS NEW GUINEA									
Klamono	Nederlandsche Nieww Guinea Pet. Mij. (Shell)	1936						1,146	7,895
Mogoi		1940							459
Wasian		1940							862
SARAWAK									
Miri	Sarawak Oilfields, Ltd.	1911	1	56	57	800		180,000	69,759,000
SUMATRA									
Northern Sumatra									
Dj Rajeu	N. V. de Bataafsche Pet. Mij. (Shell)	1929							559,000
Gebang		1936							135,000
Pangkalan Soesoe		1917							6,287,000
Pase	N. V. Standard-Vacuum Pet. Mij.	1937							52,000
Perlak	N. V. de Bataafsche Pet. Mij. (Shell)	1900							47,870,000
Peulo Pandjang		1928							11,243,000
Rantau		1929							55,513,000
Serangdjaja		1926							7,551,000
P. Taboehan		1937							3,283,000
Telaga Said, Darat, K. Gadjah		1893					Abandoned		23,621,000
Central Sumatra									
Lirik	N. V. Standard-Vacuum Pet. Mij.	1941					Abandoned		242,000
Oekoei		1941							1,000
Southern Sumatra									
Babat	N. V. de Bataafsche Pet. Mij. (Shell)	1901					Abandoned		8,136,000
Badjoebang		1927					Abandoned		24,794,000
Benakat	N. V. Standard-Vacuum Pet. Mij.	1933	38		38	3,000		124,000	37,270,000
Betceng	N. V. de Bataafsche Pet. Mij. (Shell)	1923							2,100,000
Djirak	N. V. Standard-Vacuum Pet. Mij.	1930	9		9	136		11,000	21,770,000
Karang Ringin	N. V. de Bataafsche Pet. Mij. (Shell)	1903					Abandoned		1,572,000
Kenali Asam		1931							19,204,000
Kloeang		1914							27,882,000
Limau	N. V. Standard-Vacuum Pet. Mij.	1928	2	3	5	1,100		80,000	5,532,000
Mangoendjaja		1935							9,866,000
Meara Senami		1938							93,000
Meara Enim (Batoe Kras)		1903	1	9	10	157	..	12,000	28,172,000
Radja		1941							Drill'g fuel only
Selo		1938							47,000
Soeban Boeroeng	N. V. de Bataafsche Pet. Mij. (Shell)	1936					Abandoned		6,800,000
Soeban Djerigi		1905		21	21	800		73,000	33,406,000
Talang Akar-Pendopo	N. V. Standard-Vacuum Pet. Mij.	1922	152		152	17,500		1,155,000	118,178,000
Talang Djimar	N. V. de Bataafsche Pet. Mij. (Shell)	1937	47		47	23,000		2,402,000	25,201,000
Tandjoeng Loentar		1912				..			4,079,000
Tempino		1931							36,067,000
Totals			321	646	967	110,343	2,098,000	21,229,146	1,239,180,216

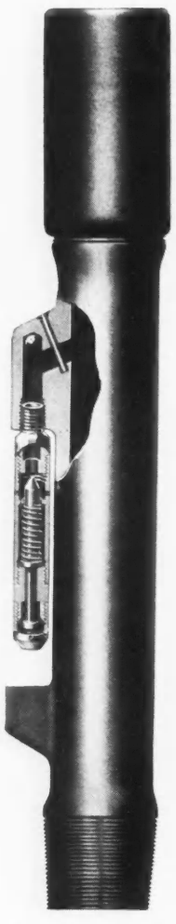
Regardless of Well Conditions, Gas Lift is the Most Economical Method of Artificial Lift

GOT & OLSCO SETS THE PACE IN GAS LIFT

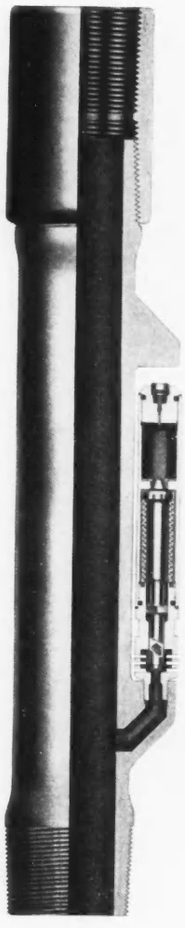
● Yes, regardless of whether a well produces ten barrels per day or a thousand, if it has to be *artificially* produced then gas lift is your most economical method of producing it.

And because of vast experience in gas lift work, with an engineering staff and well equipped plant devoted almost *exclusively* to design and manufacture of gas lift, GOT-OLSCO is your best source for dependable gas lift equipment. From GOT-OLSCO, you have a choice . . . not one so-called "all-purpose" valve but *several distinct types* of valves, each designed to do a better job under specific conditions.

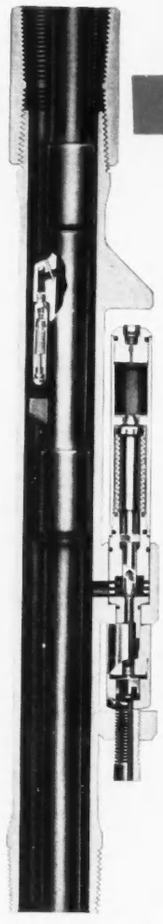
For the full story on this equipment, write for your *personalized* copy of the new GOT-OLSCO catalog. It contains 38 pages of information pertaining to gas lift equipment and problems; tells how dual completions can be efficiently lifted and explains why, even if high pressure gas is not available, *gas lift is still your most economical method of artificial lift.*



GOT-OLSCO Type "G" Pressure Differential Valve.



Type "O" Pressure Controlled Valve with Protected Bellows.



GOT-OLSCO Dual Completion Valves, using 1" and 2" tubing.

GOT-OLSCO SALES AND SERVICE POINTS

Alice, Texas Longview, Texas Houston, Texas Tyler, Texas Odessa, Texas
Jennings, La. Houma, La. Oklahoma City, Okla.

Export Representative

Americas Manufacturing Company
C. R. Sommers Barranquilla, Colombia

DISTRIBUTOR

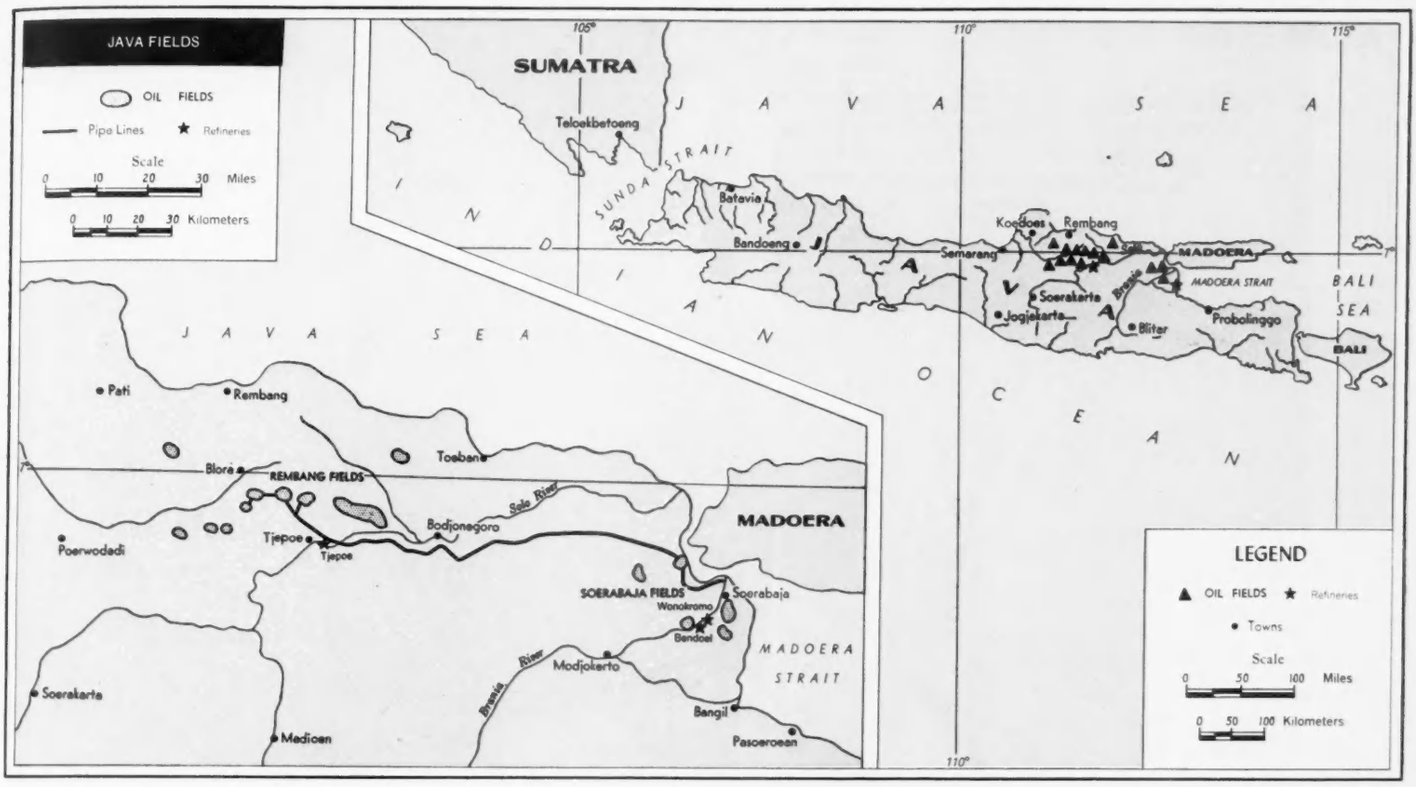
GARRETT OIL TOOLS • LONGVIEW, TEXAS

MANUFACTURER

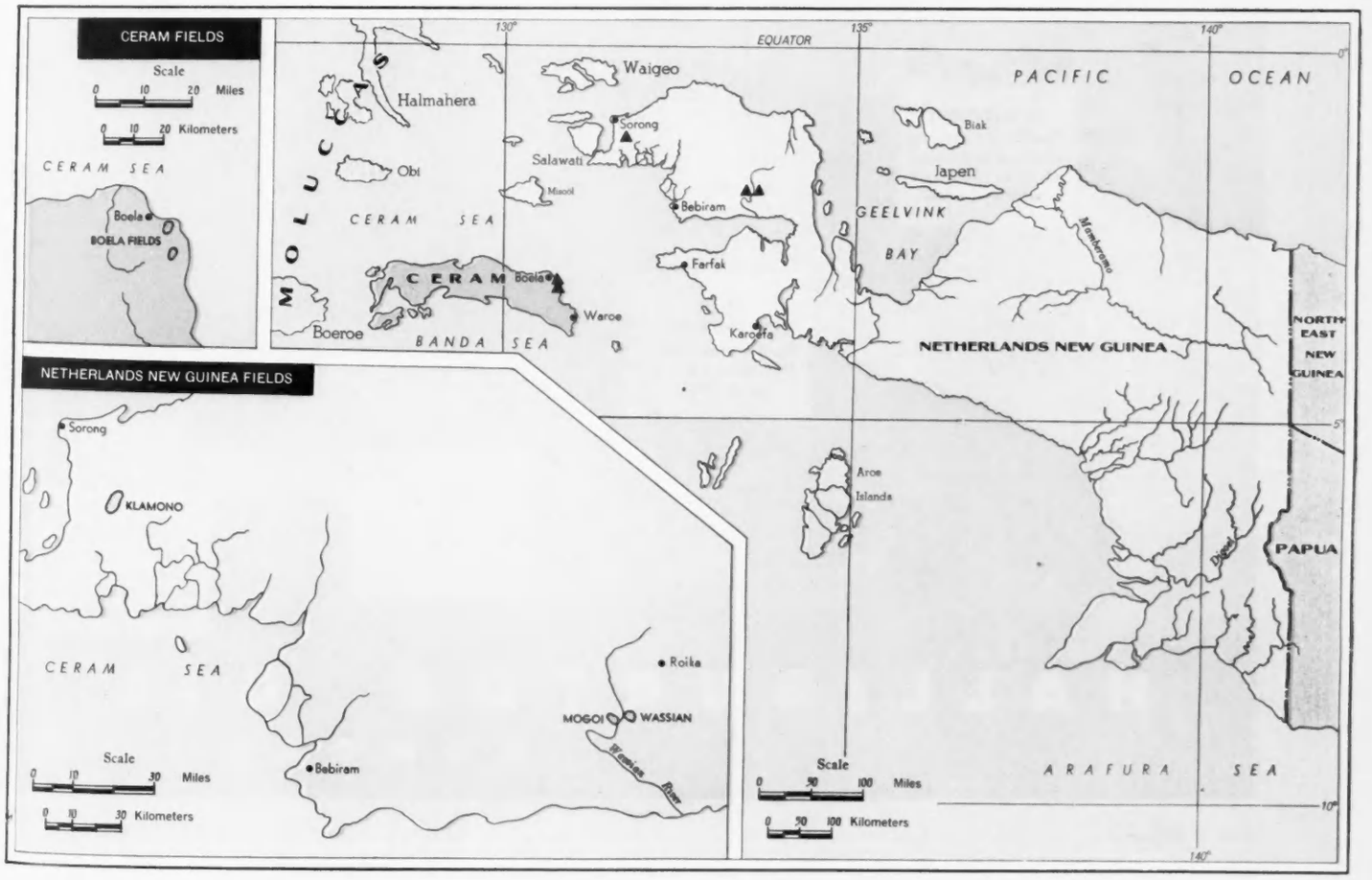
OLSCO MFG. COMPANY

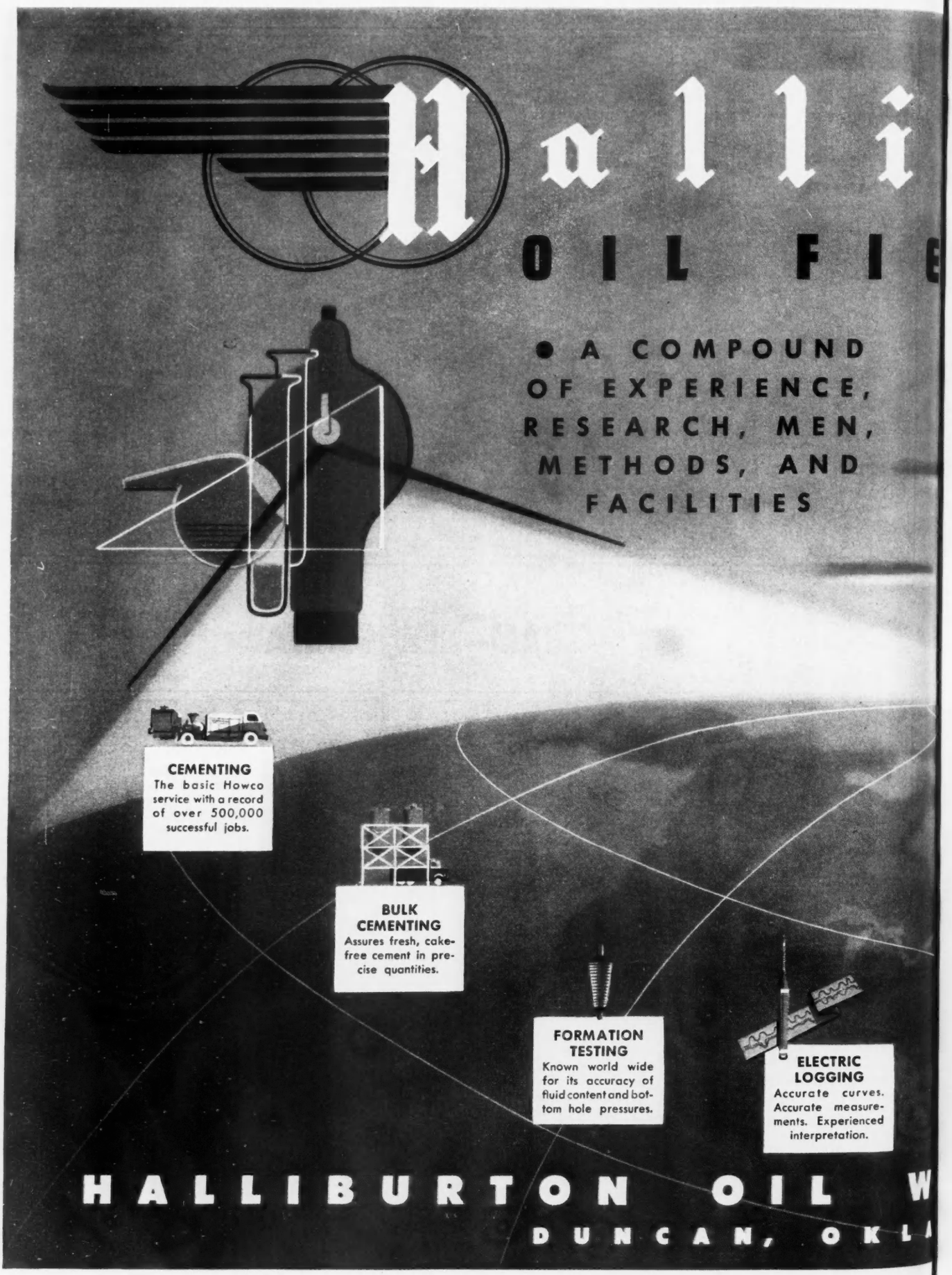
LONGVIEW, TEXAS

JAVA

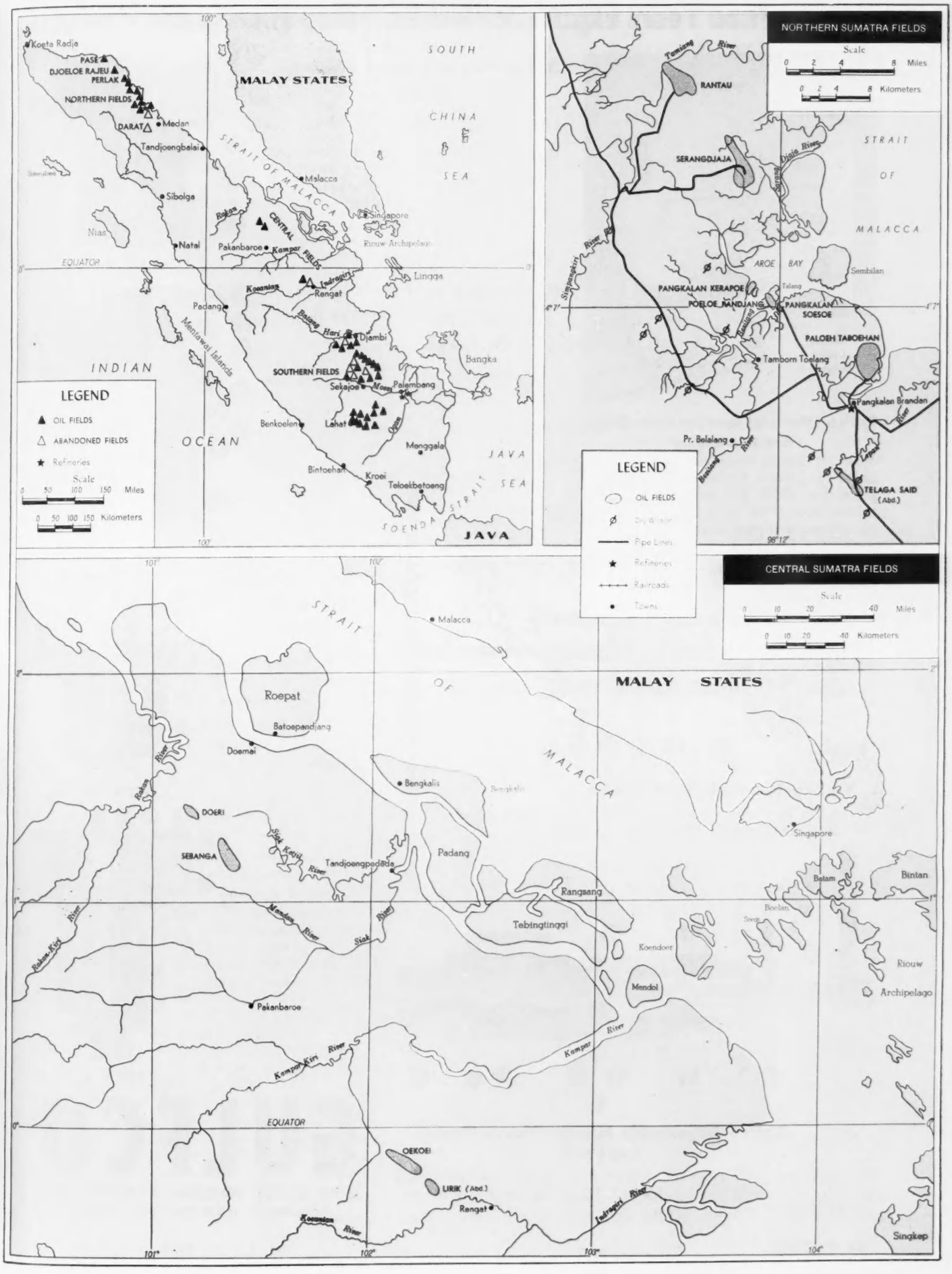


CERAM—NEW GUINEA




Halli
OIL FIE
• A COMPOUND OF EXPERIENCE, RESEARCH, MEN, METHODS, AND FACILITIES
CEMENTING
The basic Howco service with a record of over 500,000 successful jobs.
BULK CEMENTING
Assures fresh, cake-free cement in precise quantities.
FORMATION TESTING
Known world wide for its accuracy of fluid content and bottom hole pressures.
ELECTRIC LOGGING
Accurate curves. Accurate measurements. Experienced interpretation.
HALLIBURTON OIL W
DUNCAN, OKL

SUMATRA—Northern and Central Fields



Twenty-Nine Years Experience Behind These High Grade Products

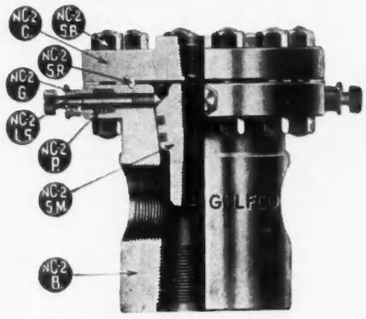
Gulfco Boiler Equipment

Gulfco (Martois) Low Pressure Cross Fire Gas Burner

Multi-jet system maintains a cross fire above the mixers. Combustion is so complete that 100% hp. rating can be obtained from 8 oz. to 2 lbs. pressure of gas without artificial draft.

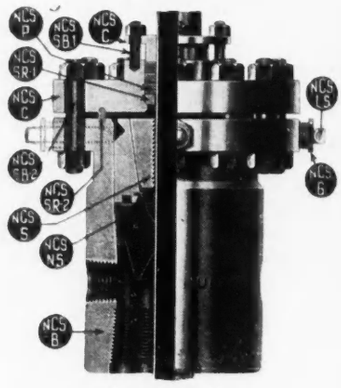
Gulfco Forged Steel Tubing Heads

For 2,000 lbs., 4,000 lbs., 6,000 lbs., test pressures. Made to A.P.I. specifications.



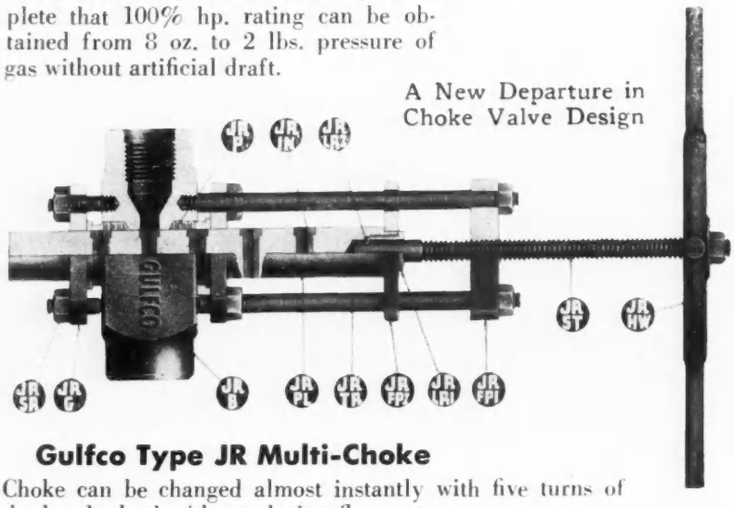
Type NC-2

Full opening head—slip suspension—for 2,000 lbs., 4,000 lbs., 6,000 lbs. test pressures.



Type NC-S

A New Departure in Choke Valve Design

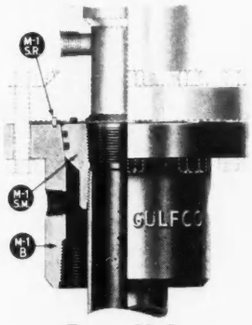


Gulfco Type JR Multi-Choke

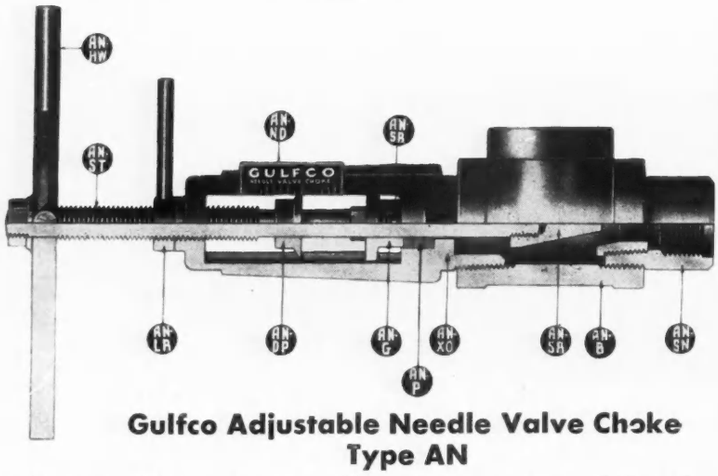
Choke can be changed almost instantly with five turns of the hand wheel without closing flow gates.

Gulfco Forged Steel Casing Heads

A.P.I. flanged "Boll Weevil" suspension casing head for 2,000 lbs., 4,000 lbs., 6,000 lbs., 10,000 lbs. test pressures.



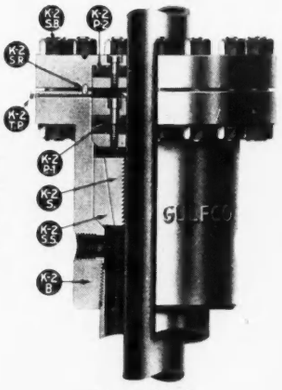
Type M-1



Gulfco Adjustable Needle Valve Choke Type AN

Indicator and index ring are calibrated so any size to full orifice diameter of the seat may be obtained. Wheel has hand grip to open and close choke against pressure.

A.P.I. flanged slip suspension casing head with double synthetic rubber seal. For 2,000 lbs., 4,000 lbs., 6,000 lbs., 10,000 lbs. test pressures.



Type K-2

GULFCO

GULF COAST MACHINE & SUPPLY CO.
Beaumont and Houston, Texas

EAST INDIES—Continued

No reliable figures are available for a comparison with 1946 output. Since the close of the war with Japan, operators of properties in Sumatra and Java have been hindered seriously by internal strife in which Indonesians have denied access to the properties to their former operators. Only recently has it been possible to carry on any type of operations in most of the Java and Sumatra fields, and many areas were still inaccessible at the close of 1947. Much encouragement was felt early in 1948 with the formal signing of the pact between the Dutch authorities and representatives of the Indonesian Republic, which would permit acceleration of industrial reconstruction throughout the region, but unease is felt over the lack of cohesion of the new republic. Although the authorities have made an agreement with the foreign interests, much of the territory is still in the hands of insurgents who do not necessarily accept the decisions of the central government.

In Netherlands New Guinea, the only field reporting production for 1947 was Klamono. More because of accessibility by waterways than by its importance as a reserve, it is the scene of the first drilling activity since the war. At the close of the year the Nederlandsche Nieuw Guinea Pet. Mij. (Shell, Standard-Vacuum and Cal-Tex interests) had started one rig working at Klamono, and had produced a small amount of oil. The company holds concessions on some 20 million acres in the area.

The restoration of refining capacity is proceeding faster than recovery of producing rates, and by the end of 1948, should be above the pre-war level. The Shell Group's plant at Balikpapan, totally destroyed during the war, had already reached a level of 8500 barrels daily by the end of 1947 and is expected to more than triple that capacity by the end of 1948. In Java, Shell's refinery at Wonokromo was operating at a rate of 1500 barrels daily. The company's large plant at Pladjoe, in Sumatra, whose 62,280-barrel pre-war capacity had been reduced to 27,000 barrels by war damage, was operating at 50,000 barrels daily at the end of the year. Standard-Vacuum's plant at Palembang is operating at a rate of 1000 barrels daily.

Papua

The Australasian Petroleum Company, in which Anglo-Iranian, Standard-Vacuum, and Oil Search, Ltd., hold interests, has abandoned its Kariava 1, deep wildcat 187 miles northwest of Port Moresby at 12,621 feet. As a result of aerial surveys and geological work previously done on 28,000-square miles of prospecting permits, three new locations have been made on which construction had already started early in 1948. The new wildcats are to be at Upoia and Hororo on the Vialala River, 25 and 30 miles respectively south of the deep well, and at Oroi about 50 miles northwest of Port Moresby. Two new rigs are being moved in so that drilling will proceed on all simultaneously.

Refineries of the East Indies

COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Daily Crude Runs End of 1947 (Bbls.)	Type of Refinery	Operating Status
BORENO:						
N. V. de Bataafsche Petroleum Mij.	Balikpapan	8,500	.....	8,500	Skimming	Operating
JAVA:						
N. V. de Bataafsche Petroleum Maatschappij	Tjepoe	.....	.....	.....	.....	Inaccessible
	Wonokromo	1,500	.....	1,500	Skimming-asphalt	Operating
N. V. Standard-Vacuum Pet. Mij.	Kapoehn	500	None	n. a.	Skimming	Inaccessible
SARAWAK:						
Sarawak Oilfields, Ltd.	Lutong	30,000	.....	30,000	Skimming	Operating
SUMATRA:						
N. V. de Bataafsche Petroleum Maatschappij	Pladjoe	50,000	7,700	50,000	Skimming, Cracking	Operating
	P. Brandan	.....	.....	.....	.....	Inaccessible
N. V. Standard-Vacuum Pet. Mij.	Palembang	1,000	.....	1,000	Skimming, Cracking	Rebuilding

Engineering and Geological Data on East Indies Fields

COUNTRY REGION AND FIELD	Range of Gravity Oil (API)	PRODUCING FORMATIONS			Type of Structure
		Name	Kind	Age	
BORNEO					
Anggana-Moeara	19-33	Balikpapan Series and Poeloe Balang	Sands and Shale	Miocene	Anticline
Sambodja	14.5-34	" " "	Shale	Miocene	Anticline
Sanga Sanga	18-36	" " "	Shale	Miocene	Anticline
Tandjoeng	40	.....	Sands, Grit—Sands and Shale	Eocene	Anticline
Tarakan	20	Tarakan Series	Sands and Shale	Pliocene	Anticline
BRUNEI					
Seria	19-33	.....	Sands	Tertiary	.....
CERAM					
Boela-Lemoen	23	Boela	Sand, Shale	Pliocene-Tri.	Faulted Anticline
JAVA					
Kawengan	34.5	Ngrajong	Sand, Limestone, Marl	Tertiary Mio.	Anticline
Kroeka	30.5	Globegerinae	Lime, Sand, Shale	Tertiary Mio.	Anticline
Ledok	43	Wonotjolo Ngrajong	Sand, Sandy Limestone, Marl	Tertiary Mio.	Anticline
Loesi	40	.....	Sand	Tertiary	.....
Ngliron	40	.....	Sand	Tertiary	.....
Nglobo-Semanggi Banjoeasin	43	Wonotojolo Ngrajong	Sand, Sandy Limestone, Marl	Tertiary Mio.	Anticlines
Petak	40	.....	Sand	Tertiary	.....
Soerabaja	24.5	Globegerinae	Lime, Sand, Shale	Tertiary Mio.	Anticlines
Tremboel	40	.....	Sand	Tertiary	.....
NETHERLANDS NEW GUINEA					
Klamono	n. a.	Klasafet	Lime	Miocene	Anticline
Mogoi	46	Klasafet	Lime	Miocene	Anticline
Wasian	48	Klasafet	Lime	Miocene	Anticline
SARAWAK					
Miri	21.5-43	....	Sands	Tertiary	....
SUMATRA					
Northern Sumatra					
Dj Rajeu	54.5	Seuroela	Sand, Shale	Pliocene	Anticline
Gebang	54	Keutapang	Sand, Shale	Miocene	Anticline
Pangkalan Soesoe	56	Keutapang	Sand, Shale	Miocene	Anticline
Pase	23-30	.....	Sand	Tertiary	.....
Perlak	57	Keutapang	Sand, Shale	Miocene	Anticline
Poeloe Pandjang	55.5	Keutapang	Sand, Shale	Miocene	Anticline
Rantau	48.5	Keutapang	Sand, Shale	Miocene	Faulted Anticline
Serangdjaja	64.5	Keutapang	Sand, Shale	Miocene	Anticline
P. Tabcehan	52.5	Keutapang	Sand, Shale	Miocene	Anticline
Telaga Said, Darat, K. Gadjah	51.5	Grenskiei	Sand, Shale	Miocene	Anticline
Central Sumatra					
Lirik	34	....	Sand	Tertiary	.....
Oekoei	34	....	Sand	Tertiary	.....
Southern Sumatra					
Babat	38	Lower Palembang	Sand, Shale	Tertiary Mio.	Anticline
Badjoebang	46.5	Lower Palembang	Sand, Shale	Tertiary Mio.	Faulted Anticline
Benakat	38	.....	Sand	Tertiary	.....
Betoeng	40.5	Lower Palembang	Sand, Shale	Tertiary Mio.	Anticline
Djirak	38	.....	Sand	Tertiary	.....
Karang Ringin	42.5	Middle and Lower Palembang	Sand, Shale	Tertiary, Plio. and Mio.	Anticline
Kenali Asam	22-46.5	Lower Palembang	Sand, Shale	Tertiary Mio.	Faulted Anticline
Kloeang	40	Lower Telissa Series	Lime, Sand, Shale	Tertiary Mio.	Faulted Anticline
Limau	25.5	Lower Telissa Series	Sand, Shale	Miocene	Faulted Anticline
Mangoendjaja	24.5	Middle and Lower Palembang	Sand, Shale	Tertiary Plio. and Mio.	Anticline
Moeara Senami	48	Lower Palembang	Sand, Shale	Tertiary Mio.	Anticline
Moeara Enim (Batee Kras)	46	Middle and Lower Palembang	Sand, Shale, Coal	Tertiary Plio. and Mio.	Anticline
Radja	40	.....	Sand	Tertiary	.....
Selo	38	.....	Sand	Tertiary	.....
Soeban Djerigi	46	Middle and Lower Palembang	Sand, Shale, Coal	Tertiary Plio. and Mio.	Anticline
Talang Akar-Pendopo	38	.....	Sand	Tertiary	.....
Talang Djimar	28.5	Lower Telissa Series	Sand, Marl	Miocene	Faulted Anticline
Tandjoeng Loentar	56	Middle and Lower Palembang	Sand, Shale, Coal	Tertiary Plio. and Mio.	Anticline
Tempino	48	Lower Palembang	Sand, Shale	Tertiary Mio.	Faulted Anticline

J. F. Pritchard-designed-engineered and constructed gasoline plant for Shamrock Oil and Gas Company's McKee Plant.

WESTERN

GASOLINE PLANT

SHELL-AND-TUBE EXCHANGERS

True economy of design and operation in heat transfer equipment can be readily discovered in its service record—year in and year out. Western heat exchangers are known widely and favorably for their steady dependability—their *consistent efficiency*.

Your exacting heat transfer requirements merit your consideration of Western's high standards in design and fabrication.

ENGINEERS—DESIGNERS—MANUFACTURERS

All Types Shell and Tube Exchangers
Atmospheric Sections
Submerged Sections
Reboilers

Special! for
MANAGEMENT
ENGINEERING
PURCHASING

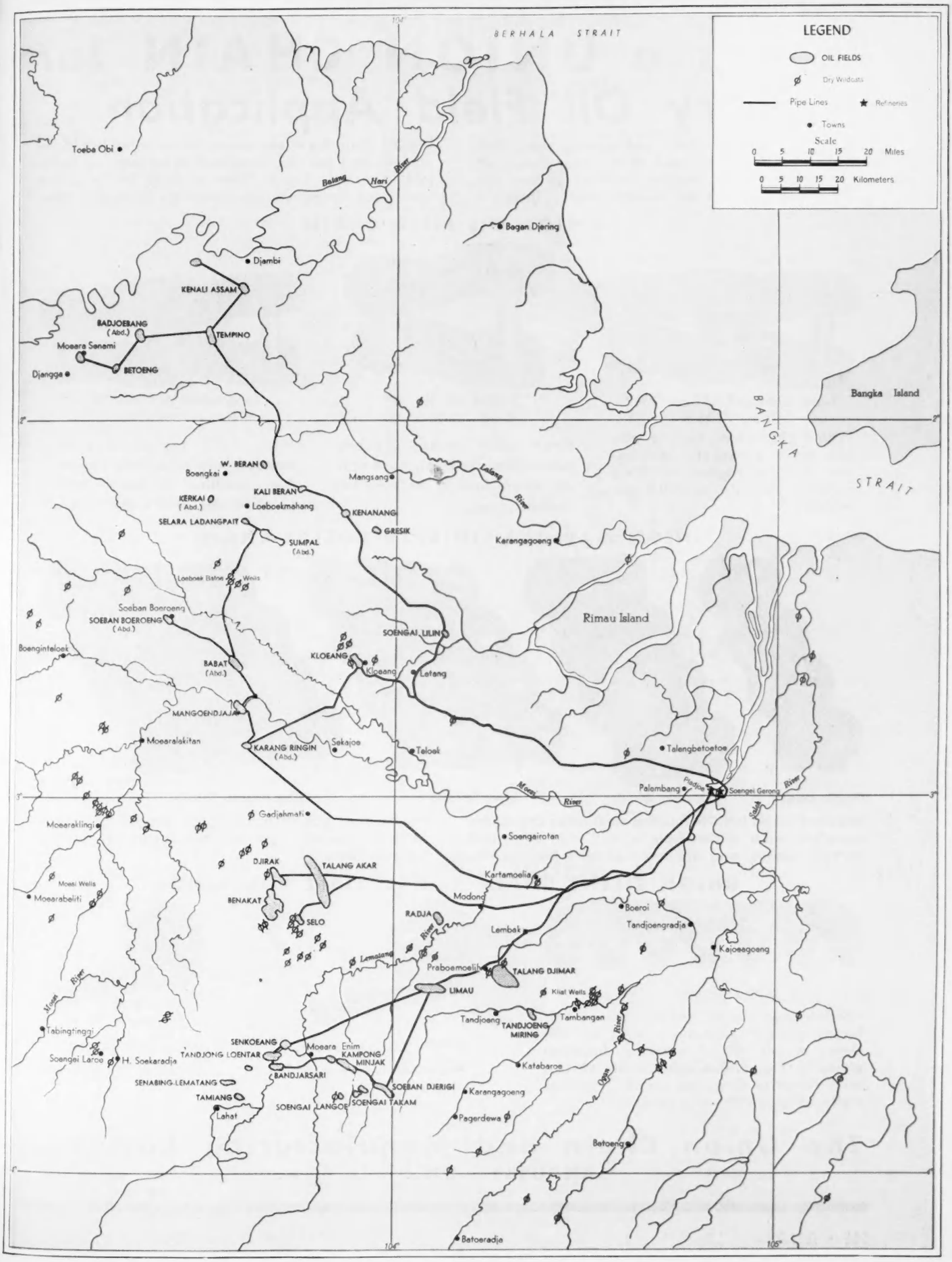
Western's new 28-page booklet is now available to help with your heat transfer problems.

DISTRIBUTORS OF OIL COUNTRY EQUIPMENT
PIPE, VALVES AND FITTINGS

WESTERN SUPPLY Co

P. O. Box 1888 **TULSA, OKLAHOMA** Phone: 8211 - L.D. 243

SUMATRA—Southern Fields



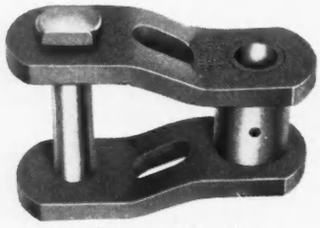
There's a **UNION CHAIN** *for Every Oil Field Application*

Chain is our business—chain and nothing else. Built into the UNION line of silent chain, roller chain, API chain, sprockets and flexible couplings is that plus value which results from specialization. There's a UNION chain for every power transmission job in the oil field, and you can count on it to measure up to the job! See your Supply Store or write to The Union Chain and Manufacturing Company, Sandusky, Ohio.

UNION OIL FIELD CHAIN

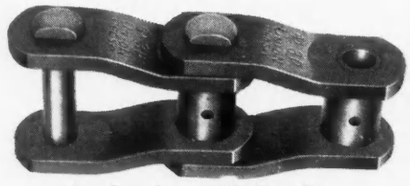
Superintendent API No. 3⅛P
Union 3125-R

Pitch 3.125 inches. For use with cut tooth sprockets. Recommended for higher drilling speeds. Single or multiple widths.



Jumbo API No. 4P
Union 1240-SXX

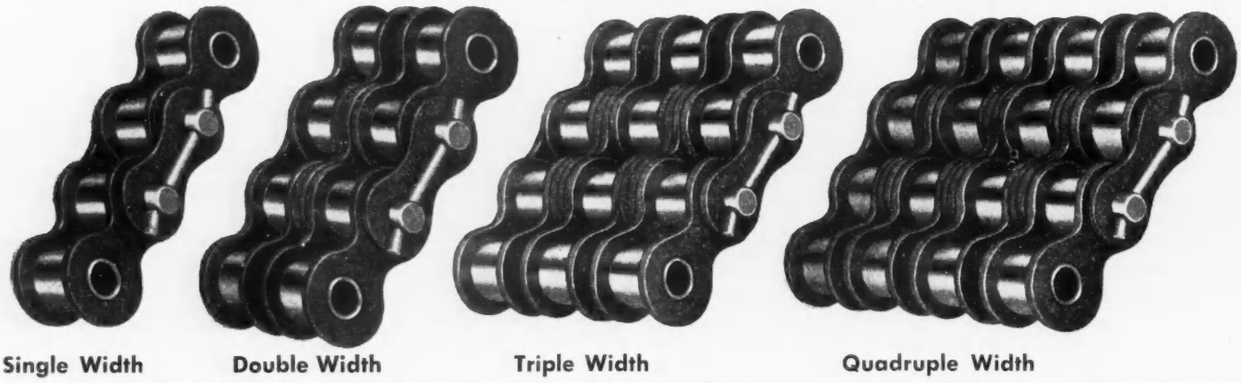
Pitch 4.063 inches. Recommended for extremely hard drilling where load is the most important factor.



Toolpusher API No. 3P
Union 1190-SXX

Pitch 3.075 inches. Recommended where drilling ranges from medium to hard. Also in AP14 size and 4.063" pitch.

UNION MACHINE FINISHED ROLLER CHAIN



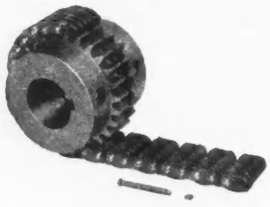
Single Width | Double Width | Triple Width | Quadruple Width

Standard Series UNION finished steel roller chains are manufactured in pitches from ⅜" to 2½" in single and multiple widths, and are recommended for efficient, trouble-free power transmission service at a wide range of operating speeds. Various styles of sprockets are available.

UNION SILENT CHAIN and FLEXIBLE COUPLINGS

UNION SILENT CHAIN

UNION silent chains transmit power uniformly without pulsation and at an efficiency of over 98%; never slip; have an elasticity for absorbing sudden shocks; wide range of operating speeds. Various styles of sprockets are available.



UNION SILENT CHAIN
Flexible Couplings

UNION ROLLER CHAIN
Flexible Couplings

The Union Chain and Manufacturing Company

SANDUSKY - OHIO - U. S. A.

AUSTRALIA

THE year 1947 has seen a sharp acceleration of the exploratory program now getting under way in all of Australia. Starting in the latter part of 1946 and continuing through 1947, a number of companies, with the support of the Government of the Australian Commonwealth, have increased their holdings, and a program of geological and geophysical reconnaissance is already leading to formulation of plans for more intensive investigation of some areas.

The Australian Mining and Smelting Company, Ltd., associated with Bonaparte Gulf Company, Ltd. (Zinc Corporation, Ltd., and Vacuum Oil Company, Ltd.) has carried out extensive aerial and geological surveys in Western Australia and in the Northern Territory, from which the general outlines of several areas have been mapped. These areas are scheduled for more detailed geological and geophysical work, the most favorable to date being some off-shore areas in the Joseph Bonaparte Gulf. The Australian Motorists Petrol Company, Ltd., has also been active in acquisition of permits in both Western and Northern areas, with some work scheduled to start during 1948.

One of the most interesting areas is the Great Artesian Basin which extends into the three states of Queensland, New South Wales, and South Australia, and covers an area of some 92,100 square miles (58,944,000 acres). The Zinc Corporation, Vacuum Oil Company, and D'Arcy Exploration Proprietary, Ltd., formed the Fromme-Broken Hill Company Proprietary, Ltd., in September of 1947, pooling all of their holdings in the area. Last year the three companies spent around a third of a million dollars, starting out with a magnetometer and gravitymeter traverse along a triangular course between the towns of Patchaworra, Moolawatana and Tiboobarra, with some detail work in the area east of Lake Fromme in which they were assisted by the Government's loan of a geophysical party and other equipment. Meanwhile a geophysical profile is being worked within the triangle itself along the line between South Australia and the adjoining states of Queensland and New South Wales. Geological studies being carried on at the same time should furnish valuable data in location of drilling prospects.

In Queensland four of the companies holding licenses in the Roma area have pooled for carrying on geophysical work, and Shell (Queensland) Development, Proprietary Ltd., is investigating the Rolleston area, north of Roma, both with geophysical work and by drilling a series of core tests.

Wildcat drilling is being carried on by Condamine Oil Pty., Ltd., which is starting a test east of the town of Chinchilla, and by Murilla Oil, Ltd. which was drilling below 5900 feet early in 1948 in a wildcat in the Boyanda area.

An interesting project in the Lakes Entrance area, Victoria, is construction of a 10-foot diameter reinforced concrete shaft to a depth of 1156 feet where a work chamber was built from which horizontal drilling of glauconitic oil-bearing formations will be undertaken. Lakes Oil Limited is undertaking the project originally started by the Commonwealth and State governments.

A well was completed by the State and Commonwealth in the Nelson area of Victoria to 7300 feet. Operations were suspended pending additional geophysical work in the locality.

Refineries of Australia

State and Company	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery	Operating Status
NEW SOUTH WALES					
Bitumen & Oil Refineries, Ltd. (Cal.-Tex.)	Bunnerong (South Sydney)	1,700	None	Skimming	Operating June '48.
National Oil, Ltd.	Glen Davis	6,000	1,000	Shale Oil Distillation	Operating
Shell Oil Co. of Australia, Ltd.	Clyde	7,000	1,000	Complete	Expanded in 1947
VICTORIA					
Commonwealth Oil Refineries, Ltd. (Anglo-Iranian)	Laverton	3,500	None	Skimming	Operating
Vacuum Oil Co. (Standard-Vacuum)	Altona	1,300	None	Skimming, Lube, asphalt	Nearly completed
Total	5 Plants	19,500	2,000		

NEW ZEALAND

After a 67-year history of exploration, the search for oil in New Zealand has been virtually abandoned. Small fields at Moturoa and Taranaki on North Island have produced a cumulative total of only about 80,000 barrels. A number of local and foreign concerns participated in the drilling of numerous wildcats through the years, one of which went to 10,925 feet, but results have been entirely disappointing. Taranaki Oilfields, Ltd., active since 1924, was dissolved last year.

ADVERTISERS' INDEX

A

*A-1 Bit & Tool Co. 186
Agency: Franke-Wilkinson-Schiwetz & Tips, Inc.
Advanced Exploration Co. 278
Agency: Vernon C. Davis Adv. Agcy.
*Ajax Iron Works 254
Agency: Walker & Downing, Adv.
*Allied Chemical & Dye Corp. 158
*American Iron & Machine Works Co. 34-35
Agency: Lowe Runkle Co.
*American Manufacturing Co. of Texas 10
Agency: Albert Evans Adv.
American Meter Company 106
Agency: Hixson-O'Donnell Advertising, Inc.
*American Roller Bearing Co. 78
Agency: Smith, Taylor & Jenkins, Inc.
Anchor Oil Co. 322
Agency: Wilhelm-Laughlin-Wilson & Assoc.
*Atlas Engineering Works 252
Agency: Vernon C. Davis Adv. Agcy.
Atlas Well Service Corp. 228
Agency: Vernon C. Davis Adv. Agcy.
*Axelson Manufacturing Co. 128
Agency: Heintz & Co.

B

*Baash-Ross Tool Co. 38
Agency: Dozier-Graham-Eastman, Adv.

* The asterisk indicates that detailed information on products and services of the firm will be found in current 16th (1948) edition of The Composite Catalog of Oil Field and Pipe Line Equipment.

*Baker Oil Tools, Inc. II Cover
Agency: Theo. M. Martin Co.
*Baroid Sales Division, National Lead Co. 40-41
Agency: Russell P. Ostrander, Adv.
*The Barrett Division, Allied Chemical & Dye Corp. 158
Agency: McCann-Erickson, Inc.
*Black, Sivalls & Bryson, Inc. IV Cover
Agency: The Potts-Turnbull Co.
*The Brewster Company 52-53
Agency: Bryan & Bryan, Adv.
*Bucyrus-Erie Company 216
Agency: Bert S. Gittins, Adv.
*The Buda Company 72
Agency: Andrews Agency

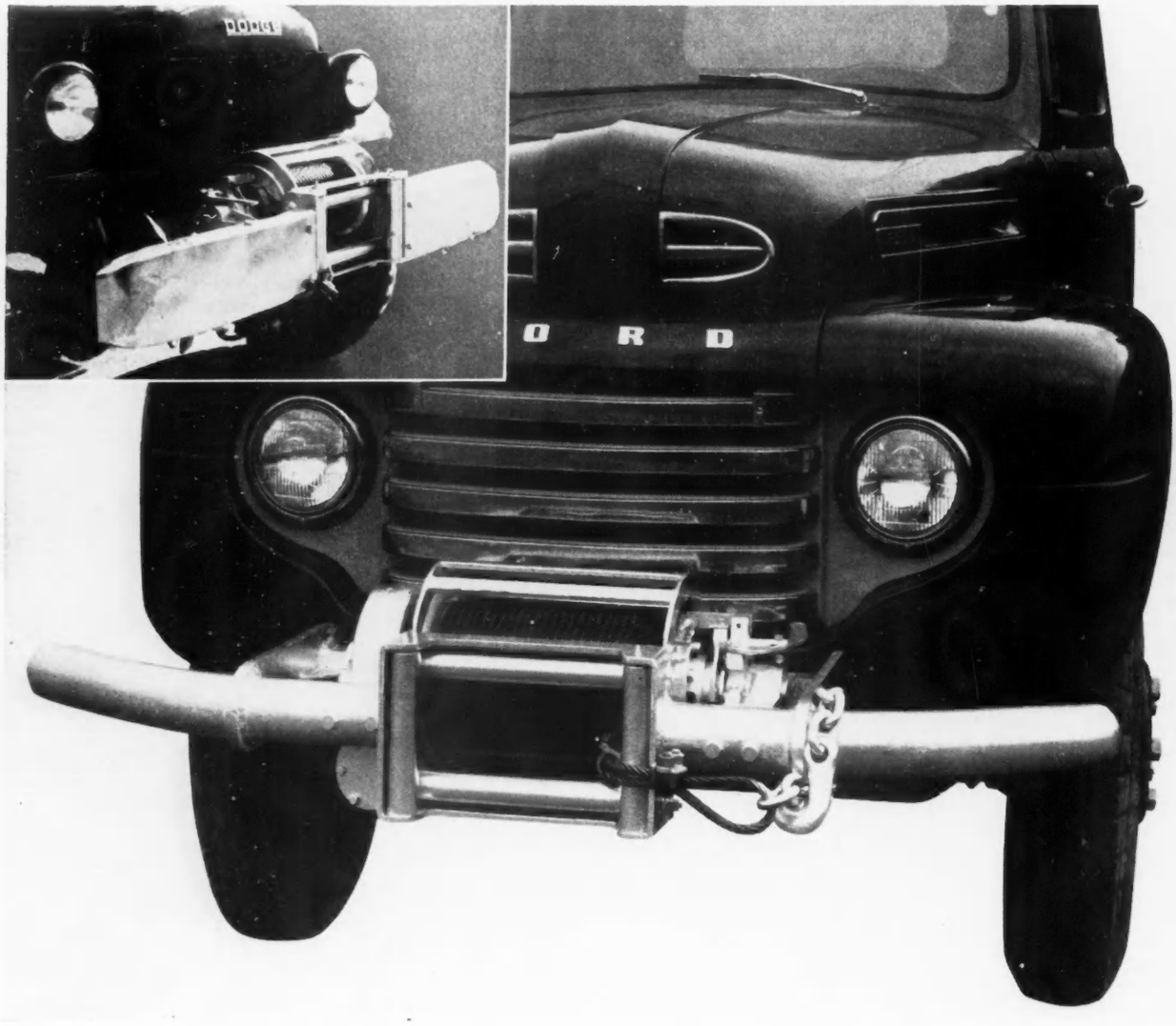
C

*Camco, Inc. 84
Agency: Brennan Advertising Agcy.
*Cameron Iron Works, Inc. 58 and 306
Agency: The Frank Dyke Co.
*Cardwell Manufacturing Co. 16-17
Agency: Associated Advertising Agency
Century Geophysical Corp. 166 and 286
Agency: Gibbons Advertising Agency, Inc.
*Clark Bros. Co. 2
Agency: Fuller & Smith & Ross, Inc.
*The Cleveland Trencher Co. 264
Agency: Gates-Bourgeois Adv. Agcy.
Coleman Instrument & Mfg. Co. 248
Agency: Brooks-Keefe Adv., Agcy.
The Continental Supply Co. 174
*The Cooper-Bessemer Corp. 258-259
Agency: The Griswold-Eshleman Co.
Core Laboratories, Inc. 280
Agency: Duvall Williams, Adv.

D

DeGolyer and MacNaughton 148
The DeLaney Company 246
Agency: Lee, Parks, Greer & Hawkins, Inc.
*Dresser Industries, Inc. 2

■ CONTINUED ON PAGE 343



THE KING UNDERSLUNG FRONT END WINCH

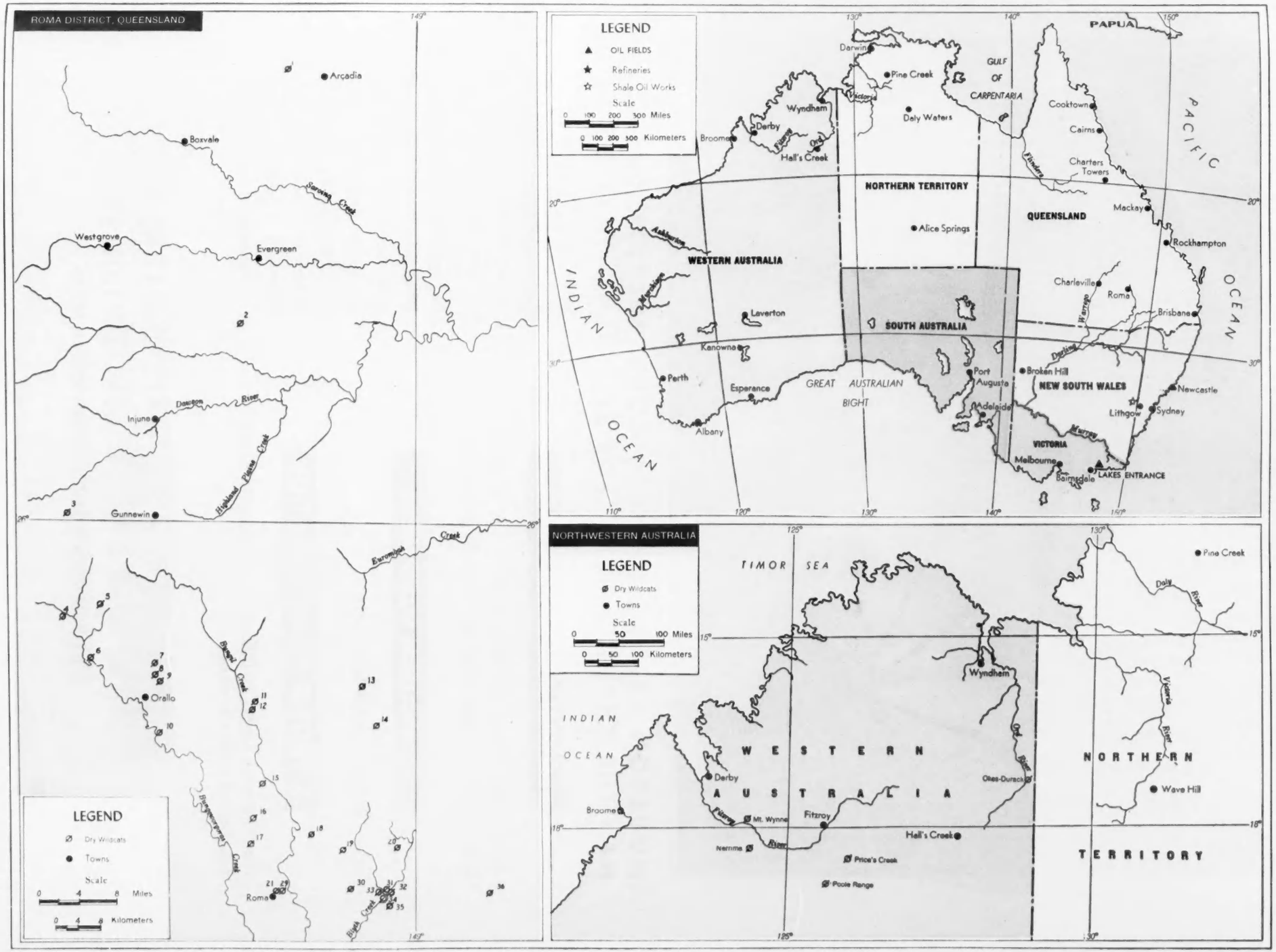
- And now, the new MODEL U-125 King Winch to meet the demand of our exploration and maintenance crew customers for a better balanced, more compact unit for quick mounting at any service location. It's the standard Model 125 mounted six inches lower for good clearance of the drive shaft.
- No more bending and cutting of truck cross-members and radiator frame—and much less air obstruction to overheat the engine.
- Old model King Winches come back after years of rough usage for overhaul, then put on new trucks for another siege of rough treatment in geophysical, pipe line, construction, maintenance work, etc.
- This underslung King Winch installation available for 1948 truck models only. Standard Models 100, 120 and 125 supplied for 1941-1947 vehicles.

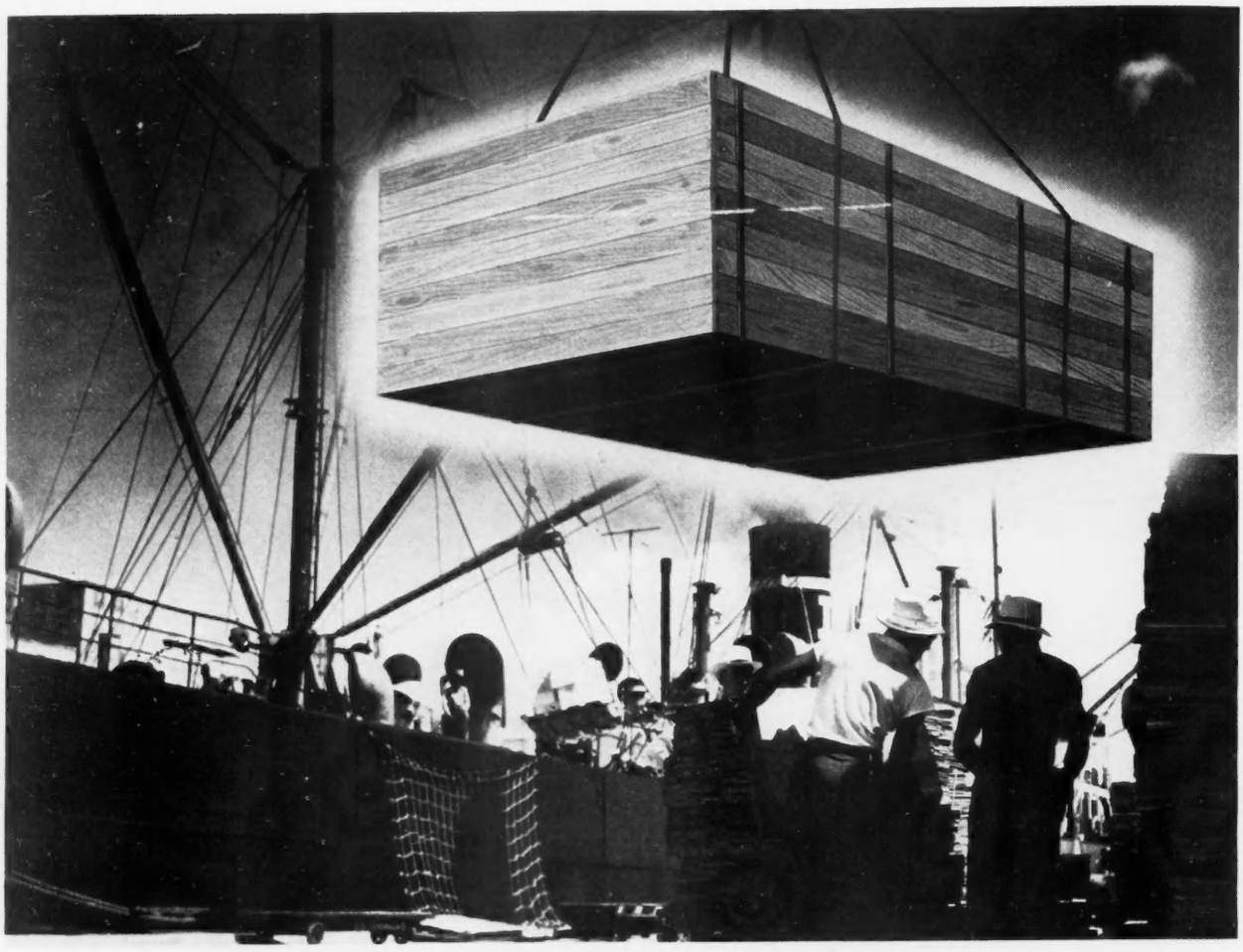
KOENIG IRON WORKS

2214 WASHINGTON AVENUE **HOUSTON 10, TEXAS**

MAIN PLANT—Front mount winches for passenger cars, jeeps and trucks.
BODY DIVISION No. 1—Special bodies for seismic work.
BODY DIVISION No. 2—All-steel full and half cabs for Willys Civilian Jeeps.

AUSTRALIA


ROMA DISTRICT, QUEENSLAND
LEGEND
Dry Wildcats
Towns
Scale
0 4 8 Miles
0 4 8 Kilometers
Arcadia
Boxvale
Westgrove
Evergreen
Injune
Gunnewin
Orallo
Roma
Burunga Creek
Bungil Creek
Balonne River
Boyd Creek
Highland Plains Creek
Dawson River
Surveyor Creek
LEGEND
OIL FIELDS
Refineries
Shale Oil Works
Scale
0 100 200 300 Miles
0 100 200 300 Kilometers
PAPUA
Darwin
Pine Creek
GULF OF CARPENTARIA
Wyndham
Derby
Broome
Hall's Creek
Daly Waters
Victoria
Ord
Fitzroy
Cooktown
Cairns
Charters Towers
Mackay
Rockhampton
Charleville
Roma
Brisbane
Newcastle
Sydney
Lithgow
Broken Hill
Port Augusta
Adelaide
Albany
Esperance
Perth
Kanowna
Laverton
Alice Springs
Ashburton
Murchison
Warrego
Darling
Murray
NORTHERN TERRITORY
QUEENSLAND
WESTERN AUSTRALIA
SOUTH AUSTRALIA
NEW SOUTH WALES
VICTORIA
INDIAN OCEAN
PACIFIC OCEAN
GREAT AUSTRALIAN BIGHT
Melbourne
Bairnsdale
LAKES ENTRANCE
NORTHWESTERN AUSTRALIA
LEGEND
Dry Wildcats
Towns
Scale
0 50 100 Miles
0 50 100 Kilometers
TIMOR SEA
INDIAN OCEAN
WESTERN AUSTRALIA
NORTHERN TERRITORY
Pine Creek
Daly River
Wyndham
Victoria River
Ord River
Derby
Broome
Fitzroy
Mt. Wynne
Hall's Creek
Ords-Durack
Wave Hill
Nerima
Price's Creek
Poole Range



HOUSTON EXPORT CRATING CONSTRUCTION COMPANY HAS THE THREE "MUSTS" FOR EFFICIENT, FAST CRATING

1. EXPERIENCED PERSONNEL

All employees have had from 2 to 4 years in all types of crating. Engineering design of crates for strength.

2. MODERN EQUIPMENT

Saws – Binders – Spray Guns – etc.

3. PROPER PLANT LOCATION

Plant location covers 80,000 sq. ft. on Houston Ship Channel. Railroad spur to yards.

COST INFORMATION AVAILABLE BEFORE JOB IS BEGUN

NOTHING TOO LARGE OR SMALL

Complete Rotary Rigs · Pressure Weld Ditching Machines · Tractors · Furniture · Acids · Batteries · Groceries · Draglines · Automobiles · Cattle · Windmills · Generators · Air Shipments · Engines · Tanks Refinery Equipment

HOUSTON EXPORT CRATING & CONSTRUCTION CO.

7400-14 WINGATE ST., HOUSTON 11, TEXAS

FOR PATTERSON-BALLAGH OIL FIELD SPECIALTIES...

There is a Patterson-Ballagh sales and service as near as your telephone or mail box. Representatives, Warehouses, Distributors, and Offices, are strategically located to supply your demand around the clock for Patterson-Ballagh Oil Field Specialties. Warehouse centers are so located that any order in the United States can be filled within 24 hours. Keep the list below as a ready reference so you can get immediate help in making your drilling and production operations easier.

SALES AND SERVICE REPRESENTATIVES

PACIFIC DIVISION

Main Office: 1900 E. 65th Street, Los Angeles 1, California

CALIFORNIA

LOS ANGELES 1: J. C. Ballagh, General Manager; Cliff Divelbiss; R. W. Shira; R. C. Medearis; R. Cypher; Phone LOgan 3246
AVENAL: O. H. Arnold, Phone 240
BAKERSFIELD: T. J. Cullen, Phone 9-9455
RIO VISTA: C. F. Brown, Phone 288-W
SANTA MARIA: L. W. Lundgren, Phone 1722L
VENTURA: G. W. Wiggett, Phone 3964

MID-CONTINENT DIVISION

Division Office: 6247 Navigation Blvd., Houston 11, Texas

TEXAS

HOUSTON: J. P. Magoffin, Division Manager; T. M. Smith, Jr.; W. W. Simpson; Phone W-7196
ALICE: H. H. Collins, Phone 856
ODESSA: Bill Bonner, Jr., Phone 4680; A. O. Wells; W. T. Appleton, Phone 4045

LOUISIANA

BATON ROUGE: J. M. Newton, Phone 20488
HOUMA: Robert Kimball, Phone 1689-R
MOORINGSPORT: W. B. Gardner, Phone 3871
NEW IBERIA: Sam Drago, Phone 1466; Frank Byers, Phone 1420
SHREVEPORT: A. G. Colgin, Jr., Phone 8-1944

OKLAHOMA

OKLAHOMA CITY: A. L. Gooden, Phone 9-1105

ILLINOIS

FAIRFIELD: G. G. Roberts, Phone 522

ROCKY MOUNTAIN DIVISION

COLORADO

RANGELY: Clell Pierson, Phone 0307-J2

WYOMING

CASPER: Gene Gardner, Phone 972
CODY: O. A. Way, Phone 434
NEWCASTLE: Carl E. Tucker

EXPORT AND FOREIGN DIVISION

LOS ANGELES: *Main Export Office;* E. M. Rees, Exp. Mgr., LOgan 3246
NEW YORK: B. A. Hilliard, 808 Graybar Bldg., Phone MUrrayhill 5-7352
SAN FRANCISCO 4: V. Indig, 330 Russ Bldg., Phone YUkon 6-1748
ENGLAND: H. F. Towler, 9 Cavendish Square, London W1
CANADA: Dominion Oilfield Supply Co., 4510 MacLeod Trail, Calgary, Alberta
MEXICO: Ing. J. M. de la Garza Cardenas, Room 306, 37 Morelos, Mexico City, D. F.
SOUTH AMERICA: T.I.P.S.A. Santiago Del Estero 286 Buenos Aires, Argentina, A. M. Huffman, Patterson-Ballagh Division of Byron Jackson Co., Edifico Roosevelt Apt. 6, Barranquilla, Colombia.

PATTERSON BALLAGH · SEAL OF QUALITY · OIL FIELD SPECIALTIES

Specify

PATTERSON-BALLAGH

DIVISION OF BYRON JACKSON CO

OIL FIELD SPECIALTIES...

BLACK, SIVALLS & BRYSON

...meets the challenge of the oil fields with Quality Products and Service

Wherever You Are, B S & B Is Ready to Solve Your Problems!

● Heat, cold; desert, swamp; acid, alkali . . . the oil industry must beat every condition in bringing its products to market. Black, Sivalls & Bryson top quality oil field equipment, designed to master any difficulty, is readily available wherever oil is found. Our organization of experienced field men is as near as your telephone, day or night.

Modern plants are ready to meet your specifications for special fabrication . . . a full-time staff of engineers is available for consultation and research. The list of B S & B products now includes: • **Blow Cases** • **Bolted Tanks** • **Bulk Storage Tanks** • **Chemical Feeders** • **Extra-Long Chokes** • **Flow Treaters** • **Fuel Vaporizers** • **Gas Scrubbers** • **Heaters** • **Liquid and Air Receivers** • **Liquid Level Controls** • **Loading Racks** • **Metering Separators** • **Oil Meters** • **Oil Seal Valves** • **Pressure Vessels** • **Propane Skid Tanks** • **Safety Heads** • **Safwalk Walkways and Stairways** • **Separators** • **Slip-Union Fittings** • **Swing Lines** • **Temperature Controls** • **Thief Hatches and Vent Valves** • **Valves** • **Welded Tanks** • **Wood Tanks.**

BS&B

EFFICIENCY RELIABILITY

EXECUTIVE OFFICES—Power & Light Bldg., Kansas City 6, Missouri. *STEEL PLANTS*—Kansas City, Missouri; Oklahoma City, Oklahoma; Casper, Wyoming; Calgary, Alberta, Can. *SALES OFFICES*—Los Angeles, California; Denver, Colorado; Great Bend and Wichita, Kansas; New Orleans and Shreveport, Louisiana; Kansas City, Missouri; New York City, New York; Oklahoma City and Tulsa, Oklahoma; Ft. Worth and Houston, Texas; Calgary, Alberta, Can. *BRANCHES*—Craig and Rangely, Colorado; Carmi and Salem, Illinois; Ellinwood, Hays and McPherson, Kansas; Lafayette and Shreveport, Louisiana; Mt. Pleasant, Michigan; Brookhaven, Mississippi; Cut Bank, Montana; Hobbs, New Mexico; Blackwell, Drumright, Duncan, Lindsey, Oklahoma City and Seminole, Oklahoma; Alice, Borger, Graham, Houston, Kilgore, Lubbock, Nocona and Odessa, Texas; Casper, New Castle and Powell, Wyoming; Calgary, Alberta, Can. *FOREIGN SALES*—New York City, New York; Stockholm, Sweden; Buenos Aires, Argentina; Montreal, Que., Can.